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```
@outputFile.imports() ::= <<
<@super.imports()>

<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>


@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>


parserCtorBody() ::= <%
<super.parserCtorBody()><\n>
TreeAdaptor =
<if(actions.(actionScope).treeAdaptorInitializer)>
 <actions.(actionScope).treeAdaptorInitializer>
<else>
```

```
 new <actions.(actionScope).treeAdaptorType; null="CommonTreeAdaptor">()
<end>
;
%>


/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
 {
 return adaptor;
 }

 set
 {
 this.adaptor = value;
 <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}
>>


treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>


ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
%>


/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = default(<ASTLabelType>);<\n>
>>


ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}; separator="\n">
<ruleDescriptor.tokenListLabels:{it|<ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);};
separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
```

```
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
>>
```

```
/** When doing auto AST construction, we must define some variables;
 * These should be turned off if doing rewrites.  This must be a "mode"
 * as a rule could have both rewrite and AST within the same alternative
 * block.
 */
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType>)adaptor.Nil();
<endif>
<endif>
<endif>
>>
```

// T r a c k i n g R u l e E l e m e n t s

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>
```

```
/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
 *  to the tracking list stream_ID for use in the rewrite.
 */
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>
```

```
/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>
```

```
/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>
```

```
/** rule when output=AST and tracking for rewrite */
```

```
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
```

```
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
}

>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
  :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.Tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
  separator="\n"
>
```

```
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
{
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.Reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
```

```
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
```

```
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());\n
>>


/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);\n
>>


/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot


/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);\n
>>


rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);\n
>>


rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);\n
>>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;\n
>>


/** What is the name of the previous value of this rule's root tree?  This
 *  let's us refer to $rule to mean previous value.  I am reusing the
 *  variable 'tree' sitting in retval struct to hold the value of root_0 right
 *  before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"


rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());\n
>>


rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);\n
>>


rewriteNodeAction(action) ::= <<
```

```
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>

createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
```

<endif>
<endif>
%>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/AST.stg
No license file was found, but licenses were detected in source scan.

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Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/Dbg.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/AST.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/Dbg.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python3/AST.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTParser.stg
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/serialize.g
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ActionScript/ASTParser.stg
No license file was found, but licenses were detected in source scan.

/*
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```
*/
scalaTypeInitMap ::= [
 "Int":"0",
 "Long":"0",
 "Float":"0.0f",
 "Double":"0.0",
 "Boolean":"false",
 "Byte":"0",
 "Short":"0",
 "Char":"0",
 default:"null" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
      docComment, recognizer,
      name, tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime._
<if(TREE_PARSER)>
```

```
import org.antlr.runtime.tree._
<endif>
<@end>


<docComment>
<recognizer>
>>


lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
    superClass="Lexer") ::= <<
object <grammar.recognizerName> {
  <tokens:{it | val <it.name> = <it.type>}; separator="\n">

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
}


class <grammar.recognizerName>(input: CharStream, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input,
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  import <grammar.recognizerName>._
  <actions.lexer.members>

  // delegates
  <grammar.delegates:
      {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|<g.recognizerName> <g:delegateName()>}; separator="\n">
  <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

  def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: CharStream) =
      this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)

<if(memoize)>
<if(grammar.grammarIsRoot)>
    state.ruleMemo = new Array[java.util.Map[_,_]](<numRules>+1)<\n> <! index from 1..n !>
<endif>
<endif>
    <grammar.directDelegates:
     {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
    <grammar.delegators:
     {g|this.<g:delegateName()> = <g:delegateName()>}; separator="\n">
     <last(grammar.delegators):{g|gParent = <g:delegateName()>}>

  override def getGrammarFileName = "<fileName>"
```

```
<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>
  <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>


/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 * for matches.  No error can be generated upon error; just rewind, consume
 * a token and then try again.  backtracking needs to be set as well.
 * Make rule memoization happen only at levels above 1 as we start mTokens
 * at backtracking==1.
 */
filteringNextToken() ::= <<
override def nextToken(): Token = {
  while (true) {
    if ( input.LA(1)==CharStream.EOF ) {
      var eof: Token = new CommonToken((CharStream)input,Token.EOF,
                    Token.DEFAULT_CHANNEL,
                    input.index(),input.index())
      eof.setLine(getLine())
      eof.setCharPositionInLine(getCharPositionInLine())
      return eof
    }
    state.token = null
 state.channel = Token.DEFAULT_CHANNEL
    state.tokenStartCharIndex = input.index()
    state.tokenStartCharPositionInLine = input.getCharPositionInLine()
    state.tokenStartLine = input.getLine()
 state.text = null
    try {
      val m = input.mark()
      state.backtracking=1 <! means we won't throw slow exception !>
      state.failed=false
      mTokens()
      state.backtracking=0
      <! mTokens backtracks with synpred at backtracking==2
        and we set the synpredgate to allow actions at level 1. !>
      if ( state.failed ) {
        input.rewind(m)
        input.consume() <! advance one char and try again !>
      }
      else {
```

```
            emit()
            return state.token
        }
    }
    catch {
        case re: RecognitionException =>
        // shouldn't happen in backtracking mode, but...
        reportError(re)
        recover(re)
    }
  }
}

override def memoize(input: IntStream,
  ruleIndex: Int,
  ruleStartIndex: Int) = {
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex)
}

override def alreadyParsedRule(input: IntStream, ruleIndex: Int):Boolean {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex)
return false
}
>>

actionGate() ::= "state.backtracking==0"

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="Object") ::= <<
object <grammar.recognizerName> {
<if(grammar.grammarIsRoot)>
  val tokenNames = Array(
      "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
  )<\n>
<endif>

  <tokens:{it | val <it.name> = <it.type>}; separator="\n">

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
          words64=it.bits)>}>
}
```

```
class <grammar.recognizerName>(input: <inputStreamType>, state<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>: RecognizerSharedState) extends <@superClassName><superClass><@end>(input, state) {
  import <grammar.recognizerName>._
  // delegates
  <grammar.delegates:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|public <g.recognizerName> <g:delegateName()>}; separator="\n">
  <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>

  <@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
  def this(input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>: <inputStreamType>) =
      this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)

      <parserCtorBody()>
      <grammar.directDelegates:
       {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this)}; separator="\n">
      <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>};
separator="\n">
      <last(grammar.delegators):{g|gParent = <g:delegateName()>}>
  <@end>

  override def getTokenNames: Array[String] = tokenNames
  override def getGrammarFileName = "<fileName>"

  <members>

  <rules; separator="\n\n">

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
  // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
  @throws(classOf[RecognitionException])
  def <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = \{
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">) \}}; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:{dfa | private val dfa<dfa.decisionNumber> = new
```

```
<grammar.recognizerName>.DFA<dfa.decisionNumber>(this)}; separator="\n">
}
>>


parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array[java.util.Map[_,_]](<length(grammar.allImportedRules)>+1)<\n> <! index from
1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>}; separator="\n">
>>


parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="TokenStream", rewriteElementType="Token", ...)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>}
        ) ::= <<
<genericParser(inputStreamType="TreeNodeStream", rewriteElementType="Node", ...)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 * rules created for syntactic predicates.  As they never have return values
 * nor parameters etc..., just give simplest possible method.  Don't do
 * any of the normal memoization stuff in here either; it's a waste.
 * As predicates cannot be inlined into the invoking rule, they need to
 * be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
@throws(classOf[RecognitionException])
def <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
  <ruleLabelDefs()>
<if(trace)>
  traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try {
```

```
        <block>
    }
    finally {
        traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
    }
<else>
    <block>
<endif>
}
// $ANTLR end <ruleName>
>>


synpred(name) ::= <<
final def <name>(): Boolean = {
    state.backtracking+=1
    <@start()>
    val start = input.mark()
    try {
        <name>_fragment() // can never throw exception
    } catch {
        case re: RecognitionException =>
        System.err.println("impossible: "+re)
    }
    val success = !state.failed
    input.rewind(start)
    <@stop()>
    state.backtracking-=1
    state.failed=false
    success
}<\n>
>>


lexerSynpred(name) ::= <<
<synpred(name)>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()> }
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) return <ruleReturnValue()><endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
```

```
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; return <ruleReturnValue()>}<endif>
>>


/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
@throws(classOf[RecognitionException])
final def <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): <returnType()> = {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  try {
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  catch {
    case re: RecognitionException =>
    reportError(re)
    recover(input,re)
 <@setErrorReturnValue()>
  }<\n>
<endif>
<endif>
<endif>
  finally {
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
    <memoize()>
    <ruleScopeCleanUp()>
    <finally>
```

```
  }
  <@postamble()>
  return <ruleReturnValue()>
}
// $ANTLR end "<ruleName>"
>>


catch(decl,action) ::= <<
catch (<e.decl>) {
  <e.action>
}
>>


ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
val retval = new <returnType()>()
retval.start = input.LT(1)<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
var <a.name>: <a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>
}>
<endif>
<if(memoize)>
val <ruleDescriptor.name>_StartIndex = input.index()
<endif>
>>


ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.push(new <it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.push(new <it.name>_scope())}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | <it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | <it.name>_stack.pop()}; separator="\n">
>>



ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | var <it.label.text>: <labelType> = null}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>: RuleReturnScope = null}; separator="\n">
```

```
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it | var <it.label.text>: <labelType>=null}; separator="\n"
>
<ruleDescriptor.charLabels:{it | int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it | var list_<it.label.text>: java.util.List=null}; separator="\n"
>
>>


ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
>>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1)<\n>
<endif>
<endif>
>>


memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex) }
<endif>
<endif>
>>


/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
```

```
@throws(classOf[RecognitionException])
final def m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>): Unit = {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>)<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  try {
<if(nakedBlock)>
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    try <block><\n>
<else>
    var _type = <ruleName>
    var _channel = BaseRecognizer.DEFAULT_TOKEN_CHANNEL
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    try <block>
    <ruleCleanUp()>
    state.`type` = _type
    state.channel = _channel
    <(ruleDescriptor.actions.after):execAction()>
<endif>
  }
  finally {
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>)<endif>
    <ruleScopeCleanUp()>
    <memoize()>
  }
}
// $ANTLR end "<ruleName>"
>>


/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@throws(classOf[RecognitionException])
def mTokens(): Unit = {
  <block><\n>
}
>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
```

```
var alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
alt<decisionNumber> match {
  <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
}
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<decision>
<@postdecision()>
alt<decisionNumber> match {
  <alts:{a | <altSwitchCase(i,a)>}>
  case _ =>
}
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
```

```
var cnt<decisionNumber>: Int = 0
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
  var alt<decisionNumber>:Int = <maxAlt>
  <@predecision()>
  <decision>
  <@postdecision()>
  alt<decisionNumber> match {
     <alts:{a | <altSwitchCase(i,a)>}>
 case _ =>
   if ( cnt<decisionNumber> >= 1 ) loop<decisionNumber>_quitflag = true
   else {
   <ruleBacktrackFailure()>
      val eee = new EarlyExitException(<decisionNumber>, input)
      <@earlyExitException()>
      throw eee
  }
 }
  cnt<decisionNumber>+=1
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
var loop<decisionNumber>_quitflag = false
while (!loop<decisionNumber>_quitflag) {
  var alt<decisionNumber>:Int = <maxAlt>
  <@predecision()>
  <decision>
  <@postdecision()>
  alt<decisionNumber> match {
     <alts:{a | <altSwitchCase(i,a)>}>
 case _ => loop<decisionNumber>_quitflag = true
  }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock
```

```
/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum, alt) ::= <<
case <altNum> =>
  <@prealt()>
  <alt>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=<endif>`match`(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)>
.asInstanceOf[<labelType>]<endif>
<checkRuleBacktrackFailure()>
>>
```

```
/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new java.util.ArrayList()
list_<label>.add(<elem>)<\n>
>>


/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
`match`(<char>)
<checkRuleBacktrackFailure()>
>>


/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>


/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1)<\n>
<else>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
<endif>
<endif>
if ( <s> ) {
  input.consume()
  <postmatchCode>
<if(!LEXER)>
  state.errorRecovery=false<\n>
<endif>
  <if(backtracking)>state.failed=false<endif>
}
else {
  <ruleBacktrackFailure()>
```

```
    val mse = new MismatchedSetException(null,input)
    <@mismatchedSetException()>
<if(LEXER)>
    recover(mse)
    throw mse
<else>
    throw mse
    <! use following code to make it recover inline; remove throw mse;
    recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>)
    !>
<endif>
}<\n>
>>


matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
val <label>Start = getCharIndex()
`match`(<string>)
<checkRuleBacktrackFailure()>
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL, <label>Start,
getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(<string>)
<checkRuleBacktrackFailure()><\n>
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=input.LT(1).asInstanceOf[<labelType>]<\n>
<endif>
matchAny(input)
<checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
```

```
<wildcard(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1)<\n>
<endif>
matchAny()
<checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">)<\n>
state._fsp-=1
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>


/** A lexer rule reference.
 *
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
```

```
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<checkRuleBacktrackFailure()>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
val <label>Start<elementIndex> = getCharIndex()
val <label>StartLine<elementIndex> = getLine()
val <label>StartCharPos<elementIndex> = getCharPositionInLine()
`match`(EOF)
<checkRuleBacktrackFailure()>
val <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
`match`(EOF)
<checkRuleBacktrackFailure()>
<endif>
>>


// used for left-recursive rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                   ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()            ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
```

```
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  `match`(input, Token.DOWN, null)
  <checkRuleBacktrackFailure()>
  <children:element()>
  `match`(input, Token.UP, null)
  <checkRuleBacktrackFailure()>
}
<else>
`match`(input, Token.DOWN, null)
<checkRuleBacktrackFailure()>
<children:element()>
`match`(input, Token.UP, null)
<checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>")
}
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
```

```
*/
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse ">
>>


/** A DFA state that is actually the loopback decision of a closure
 * loop.  If end-of-token (EOT) predicts any of the targets then it
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber> = input.LA(<k>)<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else {
   alt<decisionNumber>=<eotPredictsAlt>
}<\n>
<endif>
<endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>"


/** A simple edge with an expression.  If the expression is satisfied,
 * enter to the target state.  To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
   <targetState>
}
>>


// F i x e d  D F A  (switch case)


/** A DFA state where a SWITCH may be generated.  The code generator
 * decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n">
case _ =>
```

```
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  val nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input)<\n>
  <@noViableAltException()>
  throw nvae<\n>
<endif>
}<\n>
>>
```

```
dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
  <edges; separator="\n">
  case _ =>
}<\n>
>>
```

```
dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
input.LA(<k>) match {
<edges; separator="\n"><\n>
case _ =>
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<endif>
}<\n>
>>
```

```
dfaEdgeSwitch(labels, targetState) ::= <<
case <labels:{it | <it>}; separator=" | "> =>
  {
  <targetState>
  }
>>
```

// C y c l i c D F A

```
/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input)
>>
```

```
/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
```

```
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
 */
cyclicDFA(dfa) ::= <<
val DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n    \"">"
val DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n    \"">}>"
val DFA<dfa.decisionNumber>_transitionS: Array[String] = Array(
    <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
)

val DFA<dfa.decisionNumber>_eot: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS)
val DFA<dfa.decisionNumber>_eof: Array[Short] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS)
val DFA<dfa.decisionNumber>_min: Array[Char] =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS)
val DFA<dfa.decisionNumber>_max: Array[Char] =
DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS)
val DFA<dfa.decisionNumber>_accept: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS)
val DFA<dfa.decisionNumber>_special: Array[Short] =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS)
val DFA<dfa.decisionNumber>_transition = new
Array[Array[Short]](DFA<dfa.decisionNumber>_transitionS.length)

for (i \<- DFA<dfa.decisionNumber>_transition.indices) {
  DFA<dfa.decisionNumber>_transition(i) =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS(i))
}

class DFA<dfa.decisionNumber> extends DFA {

  def this(recognizer: BaseRecognizer) = {
    this()
    this.recognizer = recognizer
    this.decisionNumber = <dfa.decisionNumber>
    this.eot = DFA<dfa.decisionNumber>_eot
    this.eof = DFA<dfa.decisionNumber>_eof
```

```
      this.min = DFA<dfa.decisionNumber>_min
      this.max = DFA<dfa.decisionNumber>_max
      this.accept = DFA<dfa.decisionNumber>_accept
      this.special = DFA<dfa.decisionNumber>_special
      this.transition = DFA<dfa.decisionNumber>_transition
   }
  override def getDescription = "<dfa.description>"
  <@errorMethod()>
<if(dfa.specialStateSTs)>
  @throws(classOf[NoViableAltException])
  override def specialStateTransition(s: Int, _input: IntStream):Int = {
      <if(LEXER)>
      val input = _input
      <endif>
      <if(PARSER)>
      val input = _input.asInstanceOf[TokenStream]
      <endif>
      <if(TREE_PARSER)>
      val input = _input.asInstanceOf[TreeNodeStream]
      <endif>
    val _s = s
      s match {
      <dfa.specialStateSTs:{state |
      case <i0> => <! compressed special state numbers 0..n-1 !>
         <state>}; separator="\n">
      case _ =>
      }
<if(backtracking)>
      if (state.backtracking>0) {state.failed=true; return -1}\n>
<endif>
      val nvae = new NoViableAltException(getDescription(), <dfa.decisionNumber>, _s, input)
      error(nvae)
      throw nvae
  }\n>
<endif>
}\n>
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
 * state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
val LA<decisionNumber>_<stateNumber>: Int = input.LA(1)\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
val index<decisionNumber>_<stateNumber>: Int = input.index()
input.rewind()\n>
<endif>
s = -1
```

```
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if ( s>=0 ) return s
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>}<\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber><\n>
>>



// D F A  E X P R E S S I O N S


andPredicates(left,right) ::= "(<left>&&<right>)"


orPredicates(operands) ::= "(<operands; separator=\"||\">)"


notPredicate(pred) ::= "!(<evalPredicate(pred,\"\")>)"


evalPredicate(pred,description) ::= "(<pred>)"


evalSynPredicate(pred,description) ::= "<pred>()"


lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"


/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"


lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
>>


isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >=<lower>
&& input.LA(<k>) \<= <upper>)"
```

setTest(ranges) ::= "<ranges; separator=\"||\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope {
  <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
class <scope.name>_scope {
  <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
}
val <scope.name>_stack = new collection.mutable.Stack[<scope.name>_scope]<\n>
<endif>
>>

returnStructName(r) ::= "<r.name>_return"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
Unit
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
 * values.
 */
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
Unit
<endif>

```
<endif>
>>


delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<scalaTypeInitMap.(typeName)>
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))><\n>
>>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 *  TODO(matthewlloyd): make this static
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
final class <ruleDescriptor:returnStructName()> extends
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
  <scope.attributes:{it | var <it.name>: <it.type> = _}; separator="\n">
  <@ruleReturnMembers()>
}
<endif>
>>


parameterScope(scope) ::= <<
<scope.attributes:{it | <it.name>: <it.type>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name>
```

```
<else>
<scope>_stack.top.<attr.name>
<endif>
<endif>
%>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack(<scope>_stack.size-<negIndex>-1).<attr.name> = <expr>
<else>
<if(index)>
<scope>_stack(<index>).<attr.name> = <expr>
<else>
<scope>_stack.top.<attr.name> = <expr>
<endif>
<endif>
%>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"


/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(if (<scope>!=null) <scope>.<attr.name> else <initValue(attr.type)>)
<else>
<scope>
<endif>
%>


returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>
<else>
<attr.name> =<expr>
<endif>
%>
```

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"

// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(if (<scope>!=null) <scope>.getText() else null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(if (<scope>!=null) <scope>.getType() else 0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(if (<scope>!=null) <scope>.getLine() else 0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(if (<scope>!=null) <scope>.getCharPositionInLine() else 0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(if (<scope>!=null) <scope>.getChannel() else 0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(if (<scope>!=null) <scope>.start.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(if (<scope>!=null) <scope>.stop.asInstanceOf[<labelType>] else null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(if (<scope>!=null) <scope>.tree.asInstanceOf[<ASTLabelType>] else null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(if (<scope>!=null) (input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))) else null)
<else>
(if (<scope>!=null) input.toString(<scope>.start,<scope>.stop) else null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "(if (<scope>!=null) <scope>.st else null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getType() else 0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getLine() else 0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getCharPositionInLine() else -1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getChannel() else 0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getTokenIndex() else 0)"

```
lexerRuleLabelPropertyRef_text(scope,attr) ::=
  "(if (<scope>!=null) <scope>.getText() else null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
  "(if (<scope>!=null) Integer.valueOf(<scope>.getText()) else 0)"


// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(retval.start.asInstanceOf[<labelType>])"
rulePropertyRef_stop(scope,attr) ::= "(retval.stop.asInstanceOf[<labelType>])"
rulePropertyRef_tree(scope,attr) ::= "(retval.tree.asInstanceOf[<ASTLabelType>])"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"


lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"


// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>


/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"
```

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
val <name> = new BitSet(Array[Long](<words64:{it | <it>L};separator=",">))<\n>
>>

codeFileExtension() ::= ".scala"

true_value() ::= "true"
false_value() ::= "false"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Scala/Scala.stg
No license file was found, but licenses were detected in source scan.

@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>

```
import org.antlr.runtime.tree.*;<\n>
<endif>
>>


@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>


/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected var adaptor:TreeAdaptor = new CommonTreeAdaptor();<\n>
override public function set treeAdaptor(adaptor:TreeAdaptor):void {
  this.adaptor = adaptor;
  <grammar.directDelegates:{g|<g:delegateName()>.treeAdaptor = this.adaptor;}>
}
override public function get treeAdaptor():TreeAdaptor {
  return adaptor;
}
>>


@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
public function get tree():Object { return tree; }
>>


/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0:<ASTLabelType> = null;<\n>
>>


ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it |var <it.label.text>_tree:<ASTLabelType>=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
>>


/** When doing auto AST construction, we must define some variables;
* These should be turned off if doing rewrites.  This must be a "mode"
* as a rule could have both rewrite and AST within the same alternative
```

```
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = <ASTLabelType>(adaptor.nil());<\n>
<endif>
<endif>
<endif>
>>
```

// T r a c k i n g R u l e E l e m e n t s

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>
```

```
/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>
```

```
/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.tree);
>>
```

```
/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRefTrack(...)>
<listLabel(label, {<label>.tree})>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.tree);
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.tree})>
>>


// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = <ASTLabelType>(adaptor.nil());
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
```

```
input.replaceChildren(adaptor.getParent(retval.start),
            adaptor.getChildIndex(retval.start),
            adaptor.getChildIndex(_last),
            retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>


rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{it |var stream_<it>:RewriteRule<rewriteElementType>Stream=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
  :{it |var  stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",<it>);};
  separator="\n"
>
<referencedWildcardListLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"wildcard
<it>",list_<it>);};
  separator="\n"
>
<referencedRuleLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{it |var stream_<it>:RewriteRuleSubtreeStream=new RewriteRuleSubtreeStream(adaptor,"token
<it>",list_<it>);};
```

```
      separator="\n"
>
>>


/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>


rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>


rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext}; separator="||">) ) {
  throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>
```

```
rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>
```

```
/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, <createImaginaryNode(token,terminalOptions,args)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<createImaginaryNode(token,terminalOptions,args)>,
root_<treeLevel>));<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
 *  let's us refer to $rule to mean previous value.  I am reusing the
 *  variable 'tree' sitting in retval struct to hold the value of root_0 right
 *  before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>));<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
```

```
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<action>, root_<treeLevel>));<\n>
>>


/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>


/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>));<\n>
>>


rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>



createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
<ASTLabelType>(adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>))
<endif>
>>


createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ActionScript/AST.stg
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
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DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** How to generate rules derived from left-recursive rules.
 *  These rely on recRuleDefArg(), recRuleAltPredicate(),
 *  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
 *  templates in main language.stg
 */
group LeftRecursiveRules;

recRuleName(ruleName) ::= "<ruleName>_"
recPrimaryName(ruleName) ::= "<ruleName>_primary"

recRuleStart(ruleName, minPrec, userRetvals, userRetvalAssignments) ::= <<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
 : <recRuleName(...)>[<minPrec>]
   <if(userRetvals)>
```

```
    {
      <userRetvalAssignments; separator="\n">
    }
  <endif>
;
>>


recRule(ruleName, precArgDef, argName, alts, setResultAction, buildAST,
     userRetvals, userRetvalAssignments) ::= <<
<recRuleName(...)>[<precArgDef>]<if(userRetvals)> returns [<userRetvals>]<endif>
  :  <recPrimaryName(...)>
     <if(buildAST)>
     {
        <setResultAction>
     }
     <endif>
     <if(userRetvals)>
     {
        <userRetvalAssignments; separator="\n">
     }
     <endif>
     ( options {backtrack=false;}
     : ( options {backtrack=false;}
      : <alts; separator="\n        | ">
      )
     )*
  ;
>>


recPrimaryRule(ruleName, alts, userRetvals) ::= <<
<recPrimaryName(...)><if(userRetvals)> returns [<userRetvals>]<endif>
options {backtrack=true;}
  : <alts; separator="\n   | ">
  ;
>>


recRuleAlt(alt, pred) ::= "{<pred>}?=> <alt>"


recRuleRef(ruleName, arg) ::= "<recRuleName(...)>[<arg>]"


Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/LeftRecursiveRules.stg
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]
* Copyright (c) 2005-2008 Terence Parr
```

```
/** Template overrides to add debugging to normal Java output;
*  If ASTs are built, then you'll also get ASTDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
public static readonly string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
```

```
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
public override bool AlreadyParsedRule( IIntStream input, int ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>


ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, int port,
RecognizerSharedState state )
 : base( input, state )
{
```

```
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>


ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}
<\n>
>>


/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>


ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
```

```
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>


createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
DebugListener = proxy;
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>


@genericParser.superClassName() ::= "Debug<@super.superClassName()>"


/*
 * Much of the following rules were merged into CSharp3.stg.
 */


@rule.preamble() ::= <<
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
```

```
//>>

@rule.postamble() ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble() ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
// dbg.Terminate();
// }
//}<\n>
//>>

//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"

// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
```

```
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

// Region overrides that tell various constructs to add debugging triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"

//@ruleBlock.predecision() ::= "<enterDecision()>"

//@ruleBlock.postdecision() ::= "<exitDecision()>"

//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"

//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"

//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt() ::= "<enterAlt(n=i)>"

//@element.prematch() ::=
// "dbg.Location( <it.line>, <it.pos> );"
```

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException(mse);"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException(nvae);"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException(nvae);"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch (NoViableAltException nvae)
//{
// dbg.RecognitionException(nvae);
// throw nvae;
//}
//>>

//@cyclicDFA.errorMethod() ::= <<
//public override void Error(NoViableAltException nvae)
//{
// ((DebugParser)recognizer).dbg.RecognitionException(nvae);
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/Dbg.stg
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3. The name of the author may not be used to endorse or promote products
   derived from this software without specific prior written permission.

```
/** Template subgroup to add template rewrite output
 *  If debugging, then you'll also get STDbg.stg loaded.
 */

@outputFile.imports() ::= <<
<@super.imports()>
import org.stringtemplate.v4.*;
import java.util.HashMap;
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
/* ST returnScope.ruleReturnMembers -- empty */
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturn.memvars() ::= <<
ST *st;
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturn.properties() ::= <<
@property (retain) ST *st;
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturn.methodsDecl() ::= <<
- (ST *)getTemplate;
- (NSString *)toString;
>>


/** Add this to each rule's return value struct */
```

```
@returnScope.ruleReturn.synthesize() ::= <<
@synthesize st;
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturn.methods() ::= <<
- (ST *)getTemplate { return st; }
- (NSString *)toString { return st==nil?nil:[st render]; }
>>


@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup newSTGroup];

- (void)setTemplateLib:(STGroup *)aTemplateLib
{
  self.templateLib = aTemplateLib;
}

- (STGroup *)getTemplateLib
{
  return templateLib;
}
>>


@genericParserHeaderFile.memVars() ::= <<
<@super.memVars()>
/* ST genericParserHeaderFile.memVars -- empty now */
STGroup *templateLib; /* ST -- really a part of STAttrMap */
>>


@genericParserHeaderFile.properties() ::= <<
<@super.properties()>
/* ST genericParser.properties */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
>>


@genericParserHeaderFile.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST genericParser.methodsDecl */
- init;
- (STGroup *) getTemplateLib;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
@end
>>


@genericParser.synthesize() ::= <<
<@super.synthesize()>
```

```
/* ST genericParserImplementation.synthesize */
@synthesize templateLib;
>>

@genericParser.methods() ::= <<
<@super.methods()>
/* ST genericParser.methods */

- (STGroup *)getTemplateLib
{
  return templateLib;
}

- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}

>>

@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup newSTGroup];

- (STGroup *) getTemplateLib
{
 return templateLib;
}

- (void) setTemplateLib:(STGroup *) templateLib
{
 this.templateLib = templateLib;
}

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, { [<label> getTemplate]; })>
>>

rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
```

```
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>


replaceTextInLine() ::= <<
<if(TREE_PARSER)>
  [([(TokenRewriteStream)input getTokenStream])
  replaceFromIndex:[[input getTreeAdaptor] getTokenStartIndex:retval.start]
  ToIndex:[[input getTreeAdaptor] getTokenStopIndex:retval.start]
  Text:[retval.st render]];
<else>
  [((TokenRewriteStream)input)
  replaceFromIndex:[((Token)retval.start) getTokenIndex]
  ToIndex:[input LT:-1] getTokenIndex]
  Text:[retval.st render]];
<endif>
>>


rewriteTemplateAlt(alt) ::= <<
// <alt.description>
<if(alt.pred)>
if (<alt.pred>) {
  retval.st = <alt.alt>;
}<\n>
<else>
{
  retval.st = <alt.alt>;
}<\n>
<endif>
>>


rewriteEmptyTemplate(alts) ::= <<
nil;
>>


/** Invoke a template with a set of attribute name/value pairs.
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
 */
rewriteExternalTemplate(name,args) ::= <%
<if(args)><args:{a | [}><endif>
[templateLib getInstanceOf:@"<name>"]
 <if(args)><args:{a | add:@"<a.name>" value:<a.value>]}><endif>;
%>
```

```
/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
<if(args)><args:{a | []}><endif>
[templateLib getInstanceOf:<expr>];
<if(args)><args:{a | add:@"<a.name>" value:<a.value>]}><endif>;
%>


/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
<if(args)><args:{a | []}><endif>
[ST newST:templateLib template:"<template>"]
 <if(args)><args:{a |  add:@"<a.name>" <a.value>]}><endif>;
%>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
[(<st>) setAttribute:@"<attrName>" value:<expr>];
>>


/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
[ST newST:templateLib template:<stringExpr>];
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ST4ObjC.stg
No license file was found, but licenses were detected in source scan.

```
dfa(decisionRanks,states,edges,rankdir,startState,useBox) ::= <<
digraph NFA {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>


nfa(decisionRanks,states,edges,rankdir,startState) ::= <<
digraph NFA {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>


decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states; separator="; ">}
>>


edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead =
<arrowhead><endif>];
>>


action-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7, label = "<label>"<if(arrowhead)>, arrowhead =
```

```
<arrowhead><endif>];
>>

epsilon-edge(src,target,label,arrowhead) ::= <<
<src> -> <target> [fontname="Times-Italic", label = "e"];
>>

state(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>box<else>circle, fixedsize=true, width=.4<endif>]; <name>
>>

stopstate(name,useBox) ::= <<
node [fontsize=11, shape = <if(useBox)>polygon,sides=4,peripheries=2<else>doublecircle, fixedsize=true,
width=.6<endif>]; <name>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/templates/dot/dot.stg
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```
/*
 * [The "BSD license"]
 * Copyright (c) 2012 Terence Parr
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 * All rights reserved.
 *
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 * modification, are permitted provided that the following conditions
 * are met:
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 *    notice, this list of conditions and the following disclaimer.
 * 2. Redistributions in binary form must reproduce the above copyright
 *    notice, this list of conditions and the following disclaimer in the
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 * 3. The name of the author may not be used to endorse or promote products
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 *
 * THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
 * IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
 * OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
 * IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
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 * NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
 * DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
 * THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 * (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 * THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ToolSTGroupFile.java
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/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
*/
/** Add a variable to track last element matched */

```
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> _last;<\n>
<ASTLabelType> _first_0;<\n>
>>

/** Add a variable to track last element matched */
ruleInitializations() ::= <<
<super.ruleInitializations()>
_last = NULL;<\n>
_first_0 = NULL;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if ( ADAPTOR->getParent(ADAPTOR, retval.tree) != NULL && ADAPTOR->isNilNode(ADAPTOR,
ADAPTOR->getParent(ADAPTOR, retval.tree) ) )
{
   retval.tree = (<ASTLabelType>)ADAPTOR->getParent(ADAPTOR, retval.tree);
}
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)LT(1);
{
<ASTLabelType> _save_last_<treeLevel>;
<ASTLabelType> _first_<treeLevel>;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel>;
<endif>
_save_last_<treeLevel> = _last;
_first_<treeLevel>     = NULL;
<if(!rewriteMode)>
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
<endif>
<root:element()>
<if(rewriteMode)>
```

```
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel> == NULL ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<if(backtracking)>}<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
   <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<children:element()>
MATCHT(ANTLR3_TOKEN_UP, NULL);
<endif>
<if(!rewriteMode)>
ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
>>


/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
```

```
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else>
<if(backtracking)>if ( BACKTRACKING ==0 ) {<endif>
if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>;
<if(backtracking)>}<endif>
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupTree(ADAPTOR, <label>);
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
```

```
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>


// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( BACKTRACKING == 0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif><\n>
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}
,...)>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>


matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.matchSet(...)>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ){<endif>
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>New(<label>);
<else>
<label>_tree = (<ASTLabelType>)ADAPTOR->dupNode(ADAPTOR, <label>);
<endif>
root_<treeLevel> = (<ASTLabelType>)ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>
```

// RULE REF AST

```
/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
{
<endif>
<if(!rewriteMode)>
 ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <label>.tree);
<else>
 if ( _first_<treeLevel> == NULL ) _first_<treeLevel> = <label>.tree;
<endif>
<if(backtracking)>}<endif>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<super.listLabelAST(elem=label,...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( ( <actions.(actionScope).synpredgate> ) ) <endif>root_<treeLevel> =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>.tree, root_<treeLevel>));
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<super.listLabelAST(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
_last = (<ASTLabelType>)LT(1);
<super.ruleRefTrackAndListLabel(...)>
>>
/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRootTrack(...)>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>



/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextNode(stream_<token>))
<else>
stream_<token>->nextNode(stream_<token>)
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp(...)>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)ADAPTOR->rulePostProcessing(ADAPTOR, root_0);
<if(backtracking)>
}
<endif>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/C/ASTTreeParser.stg

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```
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*/

/** Templates for building ASTs during normal parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  The situation is not too bad as rewrite (->) usage makes ^ and !
 *  invalid. There is no huge explosion of combinations.
 */

@rule.setErrorReturnValue() ::= <<
retval.tree = (<ASTLabelType>)(ADAPTOR->errorNode(ADAPTOR, INPUT, retval.start, LT(-1), EXCEPTION));
>>
```

```
// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
```

```
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )
<endif>ADAPTOR->addChild(ADAPTOR, root_0, <createNodeFromToken(...)>);},...)>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,terminalOptions,postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_0 =
(<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <createNodeFromToken(...)>, root_0));},...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>ADAPTOR->addChild(ADAPTOR, root_0,
<label>.tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_0 = (<ASTLabelType>)(ADAPTOR-
>becomeRoot(ADAPTOR, <label>.tree, root_0));
```

```
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelAST(...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelAST(...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelAST(...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
ADAPTOR->addChild(ADAPTOR, root_0, <label>_tree);
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions) ::= "<super.wildcard(...)>"

wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>));
root_0 = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <label>_tree, root_0));
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(<label>) <! new MethodNode(IDLabel) !>
<else>
(<ASTLabelType>)(ADAPTOR->create(ADAPTOR, <label>))
<endif>
>>
```

```
ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{<\n>
<endif>
<if(!ruleDescriptor.isSynPred)>
 retval.stop = LT(-1);<\n>
<endif>
 retval.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
 ADAPTOR->setTokenBoundaries(ADAPTOR, retval.tree, retval.start, retval.stop);
   <ruleDescriptor.allTokenRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
   <ruleDescriptor.allRuleRefsInAltsWithRewrites
   :{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);}; separator="\n">
<if(backtracking)>
}<\n>
<endif>
>>
```

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*/
/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

group antlr;

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"

wantsSingleLineMessage() ::= "false"

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*/

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 * hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
 */
parserMembers() ::= <<
DebugTreeAdaptor *adaptor = [DebugTreeAdaptor newTreeAdaptor:(id)dbg Adaptor:[CommonTreeAdaptor
newTreeAdaptor]];

// fix this
- (void) setTreeAdaptor:(id<TreeAdaptor>)anAdaptor
{
  adaptor = [DebugTreeAdaptor newTreeAdaptor:dbg Adaptor:anAdaptor];
<if(grammar.grammarIsRoot)>
  adaptor = [DebugTreeAdaptor newTreeAdaptor:adaptor withDBG:dbg];
<else>
  adaptor = (DebugTreeAdaptor *)adaptor; // delegator sends dbg adaptor
<endif><\n>
  <grammar.directDelegates:{g|[<g:delegateName()> setTreeAdaptor:adaptor];}>
}

- (id<TreeAdaptor>)getTreeAdaptor
{
  return adaptor;
}<\n>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
  [DebugEventSocketProxy newDebugEventSocketProxy:self, port, <if(TREE_PARSER)>[input
getTreeAdaptor]<else>adaptor<endif>];
[self setDebugListener:proxy];
[self set<inputStreamType>:[Debug<inputStreamType> newDebug<inputStreamType>:input with:proxy]];
try {
  [proxy handshake];
}
@catch (IOException *ioe) {
  [self reportError:ioe];
}
>>
```

```
@ctorForRootGrammar.finally() ::= <<
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
>>


@ctorForProfilingRootGrammar.finally() ::=<<
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];
[proxy setTreeAdaptor:adap];
>>


@ctorForPredefinedListener.superClassRef() ::= @"super(input, dbg);"


@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
CommonTreeAdaptor *adap = [CommonTreeAdaptor newTreeAdaptor];
[self setTreeAdaptor:adap];<\n>
<endif>
>>


@treeParserHeaderFile.superClassName ::= "DebugTreeParser"


@rewriteElement.pregen() ::= "[debugListener locationLine:<e.line> column:<e.pos>];"
```

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* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
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```
*/
@genericParserHeaderFile.memVars() ::= <<
/* AST parserHeaderFile.memVars */
NSInteger ruleLevel;
NSArray *ruleNames;
<@super.memVars()>  /* AST super.memVars */
<parserMemVars()>   /* AST parserMemVars */
>>


@genericParserHeaderFile.properties() ::= <<
/* AST parserHeaderFile.properties */
<@super.properties()> /* AST super.properties */
<parserProperties()>   /* AST parserproperties */
>>


@genericParserHeaderFile.methodsDecl() ::= <<
/* AST parserHeaderFile.methodsDecl */
<@super.methodsDecl()> /* AST super.methodsDecl */
<parserMethodsDecl()>   /* AST parsermethodsDecl */
>>


@genericParser.synthesize() ::= <<
/* AST genericParser.synthesize */
<@super.synthesize()>
<parserSynthesize()>
>>


@genericParser.methods() ::= <<
/* AST genericParser.methods */
<@super.methods()>
<parserMethods()>
>>


/* additional init code for tree support */
@genericParser.init() ::= <<
/* AST genericParser.init */
<@super.init()>
[self setTreeAdaptor:[[CommonTreeAdaptor newTreeAdaptor] retain]];
>>
```

```
@genericParser.dealloc() ::= <<
/* AST genericParser.dealloc */
[self setTreeAdaptor:nil];
<@super.dealloc()>
>>


/* Add an adaptor property that knows how to build trees */
parserMemVars() ::= <<
/* AST parserMemVars */
id\<TreeAdaptor> treeAdaptor;
>>


/* Add an adaptor property that knows how to build trees */
parserProperties() ::= <<
/* AST parserProperties */
@property (retain, getter=getTreeAdaptor, setter=setTreeAdaptor:) id\<TreeAdaptor> treeAdaptor;
>>


/** Declaration of additional tree support methods - go in interface of parserHeaderFile() */
parserMethodsDecl() ::= <<
/* AST parserMethodsDecl */
- (id\<TreeAdaptor>) getTreeAdaptor;
- (void) setTreeAdaptor:(id\<TreeAdaptor>)theTreeAdaptor;
>>


/* Add an adaptor property that knows how to build trees */
parserSynthesize() ::= <<
/* AST parserProperties */
@synthesize treeAdaptor;
>>


/** Definition of addition tree support methods - go in implementation of genericParser() */
parserMethods() ::= <<
/* AST parserMethods */
- (id\<TreeAdaptor>) getTreeAdaptor
{
 return treeAdaptor;
}

- (void) setTreeAdaptor:(id\<TreeAdaptor>)aTreeAdaptor
{
 if (aTreeAdaptor != treeAdaptor) {
  treeAdaptor = aTreeAdaptor;
 }
}
>>


/** addition memVars for returnscopes */
```

```
@returnScopeInterface.memVars() ::= <<
/* AST returnScopeInterface.memVars */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>


/** the interface of returnScope properties */
@returnScopeInterface.properties() ::= <<
/* AST returnScopeInterface.properties */
@property (retain, getter=getTree, setter=setTree:) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>


/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* AST returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;<\n>
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>


/** the implementation of returnScope synthesize */
@returnScopeImplementation.synthesize() ::= <<
/* AST returnScope.synthesize */
@synthesize tree;
>>


/** the implementation of returnScope methods */
@returnScopeImplementation.methods() ::= <<
/* AST returnScope.methods */
- (<ASTLabelType> *)getTree
{
  return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
  if (tree != aTree) {
    if (tree != nil) [tree release];
    if (aTree != nil) [aTree retain];
    tree = aTree;
  }
}

- (void) dealloc
{
  self.tree = nil;
  [super dealloc];
}

>>
```

```
/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
/* AST ruleDeclarations */
<super.ruleDeclarations()>
<ASTLabelType> *root_0 = nil;<\n>
>>


ruleLabelDefs() ::= <<
/* AST ruleLabelDefs */
<super.ruleLabelDefs()>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> *<it.label.text>_tree=nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> *<it.label.text>_tree = nil;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{it | RewriteRuleTokenStream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
                    description:@"token <it>"] retain];}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{it | RewriteRuleSubtreeStream *stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
                      description:@"rule <it>"] retain];}; separator="\n">
>>


ruleCleanUp() ::= <<
/* AST ruleCleanUp */
<super.ruleCleanUp()>
<[ruleDescriptor.allTokenRefsInAltsWithRewrites,ruleDescriptor.allRuleRefsInAltsWithRewrites]:{it |
[stream_<it> release];}; separator="\n">
<!
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(backtracking)>if ( state.backtracking == 0 ) {<\n>
<endif>
  [<prevRuleRootRef()> setTree:(<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0]];<\n>
  [treeAdaptor setTokenBoundaries:[<prevRuleRootRef()> getTree]
              From:[<prevRuleRootRef()> getStart]
               To:[<prevRuleRootRef()> getStop]];<\n>
<if(backtracking)>}<\n>
<endif>
<endif>
[root_0 release];
!>
>>


rewriteCodeLabelsCleanUp() ::= <<
/* AST rewriteCodeLabelsCleanUp */
<referencedTokenLabels:{it | [stream_<it> release];}; separator="\n">
<referencedTokenListLabels:{it | [stream_<it> release];}; separator="\n">
<referencedRuleLabels:{it | [stream_<it> release];}; separator="\n">
<referencedRuleListLabels:{it | [stream_<it> release];}; separator="\n">
```

```
>>

/** When doing auto AST construction, we must define some variables;
 *  These should be turned off if doing rewrites.  This must be a "mode"
 *  as a rule could have both rewrite and AST within the same alternative
 *  block.
 */
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
<endif>
<endif>
<endif>
>>


// T r a c k i n g   R u l e   E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <endif>
  [stream_<token> addElement:<label>];<\n>
>>


/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
 *  to the tracking list stream_ID for use in the rewrite.
 */
tokenRefTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex) ::= <<
<! <super.tokenRef(...)> !>
<tokenRefBang(...)>
<if(backtracking)>
if ( !<actions.(actionScope).synpredgate> ) <endif>
  [stream_<token> addElement:<label>];<\n>
>>


/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex) ::= <<
<tokenRefRuleRootTrack(...)>
```

```
<listLabel(elem=label,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
[stream_<rule.name> addElement:[<label> getTree]];
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<! <super.ruleRefRuleRoot(...)> !>
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
  [stream_<rule.name> addElement:[<label> getTree]];<\n>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem={[<label> getTree]},...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
```

```
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;<\n>
<rewriteCodeLabels()>
root_0 = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];<\n>
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)[treeAdaptor rulePostProcessing:root_0];
[input replaceChildren:[treeAdaptor getParent:retval.start]
          From:[treeAdaptor getChildIndex:retval.start]
           To:[treeAdaptor getChildIndex:_last]
          With:retval.tree];
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;<\n>
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;<\n>
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
description:@"token <it>" element:<it>] retain];};
  separator="\n"
>
<referencedTokenListLabels:{it | RewriteRule<rewriteElementType>Stream *stream_<it> =
  [[RewriteRule<rewriteElementType>Stream newRewriteRule<rewriteElementType>Stream:treeAdaptor
    description:@"token <it>" elements:list_<it>] retain];};
  separator="\n"
>
<referencedWildcardLabels:{it | RewriteRuleSubtreeStream stream_<it> =
  [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
    description:"wildcard <it>" element:<it>] retain];};
```

```
        separator="\n"
>
<referencedWildcardListLabels:{it | RewriteRuleSubtreeStream stream_<it> =
    [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
        descriptor:"wildcard <it>" elements:list_<it>] retain];};
    separator="\n"
>
<referencedRuleLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
    [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
        description:@"token <it>" element:<it>!=nil?[<it> getTree]:nil] retain];};
    separator="\n"
>
<referencedRuleListLabels:{it | RewriteRuleSubtreeStream *stream_<it> =
    [[RewriteRuleSubtreeStream newRewriteRuleSubtreeStream:treeAdaptor
        description:@"token <it>" elements:list_<it>] retain];};
    separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | [stream_<el> hasNext]}; separator="||"> ) {
 <alt>
}
<referencedElementsDeep:{el | [stream_<el> reset];<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
>>
```

```
rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
if ( !(<referencedElements:{el | [stream_<el> hasNext]}; separator=" || ">) ) {
   @throw [RewriteEarlyExitException newException];
}
while ( <referencedElements:{el | [stream_<el> hasNext]}; separator=" || "> ) {
   <alt>
}
<referencedElements:{el | [stream_<el> reset];<\n>}>
}
>>


rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
   <a.alt>
}<\n>
<else>
{
   <a.alt>
}<\n>
<endif>
>>


/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = nil;"


rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
   <ASTLabelType> *root_<treeLevel> = (<ASTLabelType> *)[[[treeAdaptor class] newEmptyTree] retain];
   <root:rewriteElement()>
   <children:rewriteElement()>
   [treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
}<\n>
>>


rewriteElementList(elements) ::= "<elements:rewriteElement()>"


rewriteElement(e) ::= <<
<@pregen()>
```

```
<e.el>
>>


/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
// TODO: args: <args; separator=", ">
[treeAdaptor addChild:<createRewriteNodeFromElement(...)> toTree:root_<treeLevel>];<\n>
>>


/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>


/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
[treeAdaptor addChild:[stream_<label> nextNode] toTree:root_<treeLevel>];<\n>
>>


/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>


/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createRewriteNodeFromElement(...)>
old:root_<treeLevel>];<\n>
>>


rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
[treeAdaptor addChild:<createImaginaryNode(tokenType=token, ...)> toTree:root_<treeLevel>];<\n>
>>


rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createImaginaryNode(tokenType=token, ...)>
old:root_<treeLevel>];<\n>
>>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>
```

/** What is the name of the previous value of this rule's root tree? This
 * let's us refer to $rule to mean previous value. I am reusing the
 * variable 'tree' sitting in retval struct to hold the value of root_0 right
 * before I set it during rewrites. The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
[treeAdaptor addChild:[stream_<rule> nextTree] toTree:root_<treeLevel>];<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:(id\<Tree>)[stream_<rule> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteNodeAction(action) ::= <<
[treeAdaptor addChild:<action> toTree:root_<treeLevel>];<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<action> old:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:[stream_<label> nextNode]
old:root_<treeLevel>];<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
[treeAdaptor addChild:[stream_<label> nextTree] toTree:root_<treeLevel>];<\n>

```
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
  [<terminalOptions.node> new<terminalOptions.node>:<tokenType> <if(args)>, <args; separator=", "><endif>]
<else>
  <if(args)>
    [[treeAdaptor createTree:<tokenType> <if(first(args))>FromToken:<first(args)><endif>
<if(first(rest(args)))>Text:<first(rest(args))><else>Text:@"<tokenType>"<endif>] retain]
  <else>
    [[treeAdaptor createTree:<tokenType> Text:@"<tokenType>"] retain]
  <endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
  [<terminalOptions.node> new<terminalOptions.node>:[stream_<token> nextToken]<if(args)>, <args;
separator=", "><endif>]
<else>
  <if(args)> <! must create new node from old !>
    [[treeAdaptor createTree:<token> Text:<first(rest(args))>> <args; separator=", ">] retain]
  <else>
    [stream_<token> nextNode]
  <endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/AST.stg
No license file was found, but licenses were detected in source scan.

```
@outputFile.imports() ::= <<
<@super.imports()>

<if(!TREE_PARSER)>
<! tree parser would already have imported !>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
<treeAdaptorType()> treeAdaptor = default(<treeAdaptorType()>);
CreateTreeAdaptor(ref treeAdaptor);
TreeAdaptor = treeAdaptor<if(!actions.(actionScope).treeAdaptorType)> ?? new CommonTreeAdaptor()<endif>;
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
// Implement this function in your helper file to use a custom tree adaptor
partial void CreateTreeAdaptor(ref <treeAdaptorType()> adaptor);

private <treeAdaptorType()> adaptor;

public <treeAdaptorType()> TreeAdaptor
{
 get
```

```
 {
 return adaptor;
 }

 set
 {
 this.adaptor = value;
 <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
 }
>>


treeAdaptorType() ::= <<
<actions.(actionScope).treeAdaptorType; null="ITreeAdaptor">
>>


ruleReturnBaseType() ::= <%
Ast<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<ASTLabelType>, <labelType>>
%>


/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = default(<ASTLabelType>);<\n>
>>


ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <%
<super.ruleLabelDefs(...)>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.tokenListLabels:{it|<\n><ASTLabelType> <it.label.text>_tree = default(<ASTLabelType>);}>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it|<\n>RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}>
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it|<\n>RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");}>
<endif>
%>


/** When doing auto AST construction, we must define some variables;
 * These should be turned off if doing rewrites.  This must be a "mode"
 * as a rule could have both rewrite and AST within the same alternative
 * block.
 */
@alt.declarations() ::= <<
<if(autoAST && outerAlt && !rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.Nil();
```

```
<endif>
>>

// T r a c k i n g   R u l e   E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);<\n>
>>

/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
 *  to the tracking list stream_ID for use in the rewrite.
 */
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<token>.Add(<label>);
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule.name>.Add(<label>.Tree);
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>stream_<rule>.Add(<label>.Tree);
>>
```

```
/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::= <<
<\n>{
// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
<endif>
<prevRuleRootRef()>.Tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.Nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER&&rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
if (<prevRuleRootRef()>.Tree != null)
 input.ReplaceChildren(adaptor.GetParent(retval.Start), adaptor.GetChildIndex(retval.Start),
adaptor.GetChildIndex(_last), retval.Tree);
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER||!rewriteMode)>
<prevRuleRootRef()>.Tree = root_0;
<endif>
<if(backtracking)>
}
<endif>
```

```
        }

        >>

        rewriteCodeLabels() ::= <<
        <referencedTokenLabels
         :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
        RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
         separator="\n"
        >
        <referencedTokenListLabels
         :{it|RewriteRule<rewriteElementType>Stream stream_<it>=new
        RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
         separator="\n"
        >
        <referencedWildcardLabels
         :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
         separator="\n"
        >
        <referencedWildcardListLabels
         :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
         separator="\n"
        >
        <referencedRuleLabels
         :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
        <it>",<it>!=null?<it>.Tree:null);};
         separator="\n"
        >
        <referencedRuleListLabels
         :{it|RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
         separator="\n"
        >
        >>

        /** Generate code for an optional rewrite block; note it uses the deep ref'd element
         *  list rather shallow like other blocks.
         */
        rewriteOptionalBlock(
         alt,rewriteBlockLevel,
         referencedElementsDeep, // all nested refs
         referencedElements, // elements in immediately block; no nested blocks
         description) ::=
        <<
        // <fileName>:<description>
        if (<referencedElementsDeep:{el | stream_<el>.HasNext}; separator="||">)
        {
         <alt>
        }
```

```
<referencedElementsDeep:{el | stream_<el>.Reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if (!(<referencedElements:{el | stream_<el>.HasNext}; separator="||">))
{
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.HasNext}; separator="||"> )
{
 <alt>
}
<referencedElements:{el | stream_<el>.Reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
 <a.alt>
}
<else>
{
 <a.alt>
}
<endif>
>>
```

```
/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <%
<@pregen()>
DebugLocation(<e.line>, <e.pos>);<\n>
<e.el>
%>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);<\n>
```

```
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.AddChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
 *  let's us refer to $rule to mean previous value.  I am reusing the
 *  variable 'tree' sitting in retval struct to hold the value of root_0 right
 *  before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<rule>.NextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<rule>.NextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
adaptor.AddChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>
```

```
/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(stream_<label>.NextNode(), root_<treeLevel>);<\n>
>>


rewriteWildcardLabelRef(label) ::= <<
adaptor.AddChild(root_<treeLevel>, stream_<label>.NextTree());<\n>
>>


createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>


createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.NextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.Create(<token>, <args; separator=", ">)
<else>
stream_<token>.NextNode()
<endif>
<endif>
%>


Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/AST.stg
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```

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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
 * If debugging, then you'll also get STDbg.stg loaded.
 */

```
@outputFile.imports() ::= <<
<@super.imports()>
import stringtemplate3
>>
```

```
/** Add this to each rule's return value struct */
@returnScope.ruleReturnInit() ::= <<
self.st = None
>>
```

```
@returnScope.ruleReturnMembers() ::= <<
def getTemplate(self):
  return self.st

def toString(self):
  if self.st is not None:
    return self.st.toString()
  return None
__str__ = toString


>>
```

```
@genericParser.init() ::= <<
<@super.init()>
```

```
self.templateLib = stringtemplate3.StringTemplateGroup(
  '<name>Templates', lexer='angle-bracket'
  )

>>

@genericParser.members() ::= <<
<@super.members()>
def setTemplateLib(self, templateLib):
  self.templateLib = templateLib

def getTemplateLib(self):
  return self.templateLib

>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.st})>
>>

rewriteTemplate(alts) ::= <<
# TEMPLATE REWRITE
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <first(alts):rewriteTemplateAltFirst()>
  <rest(alts):{it | el<rewriteTemplateAlt(it)>}>
  <if(rewriteMode)><replaceTextInLine()><endif>

<else>
<first(alts):rewriteTemplateAltFirst()>
<rest(alts):{it | el<rewriteTemplateAlt(it)>}>
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>

replaceTextInLine() ::= <<
<if(TREE_PARSER)>
self.input.getTokenStream().replace(
  self.input.getTreeAdaptor().getTokenStartIndex(retval.start),
  self.input.getTreeAdaptor().getTokenStopIndex(retval.start),
  retval.st
  )
<else>
self.input.replace(
  retval.start.getTokenIndex(),
  self.input.LT(-1).getTokenIndex(),
```

```
    retval.st
    )
<endif>
>>


rewriteTemplateAltFirst(alt) ::= <<
<if(alt.pred)>
if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>
# <alt.description>
retval.st = <alt.alt>
<\n>
<endif>
>>


rewriteTemplateAlt(alt) ::= <<
<if(alt.pred)>if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>se:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<endif>
>>


rewriteEmptyTemplate(alts) ::= <<
None
>>


/** Invoke a template with a set of attribute name/value pairs.
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
 */
rewriteExternalTemplate(name,args) ::= <%
self.templateLib.getInstanceOf("<name>"<if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
self.templateLib.getInstanceOf(<expr><if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
```

">}<endif>)
%>

/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
stringtemplate3.StringTemplate("<template>", group=self.templateLib<if(args)>, attributes={<args:{a |
"<a.name>": <a.value>}; separator=", ">}<endif>)
%>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>

/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>)["<attrName>"] = <expr>
>>

/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
stringtemplate3.StringTemplate(<stringExpr>, group=self.templateLib)
>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Python/ST.stg
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```
/** Template overrides to add debugging to normal Java output;
 *  If ASTs are built, then you'll also get ASTDbg.stg loaded.
 */

@outputFile.debugPreprocessor() ::= "#define ANTLR_DEBUG"

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.Runtime.Debug;
using IOException = System.IO.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
public static readonly string[] ruleNames =
 new string[]
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)><! grammar imports other grammar(s) !>
int ruleLevel = 0;
public virtual int RuleLevel { get { return ruleLevel; } }
public virtual void IncRuleLevel() { ruleLevel++; }
public virtual void DecRuleLevel() { ruleLevel--; }
<if(profile)>
<ctorForProfilingRootGrammar()>
<else>
<ctorForRootGrammar()>
<endif>
<ctorForPredefinedListener()>
<else><! imported grammar !>
public int RuleLevel { get { return <grammar.delegators:{g| <g:delegateName()>}>.RuleLevel; } }
public void IncRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.IncRuleLevel(); }
public void DecRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.DecRuleLevel(); }
<ctorForDelegateGrammar()>
<endif>
<if(profile)>
```

```
public override bool AlreadyParsedRule( IIntStream input, int ruleIndex )
{
 int stopIndex = GetRuleMemoization(ruleIndex, input.Index);
 ((Profiler)dbg).ExamineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 return base.AlreadyParsedRule(input, ruleIndex);
}<\n>
public override void Memoize( IIntStream input, int ruleIndex, int ruleStartIndex )
{
 ((Profiler)dbg).Memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
 base.Memoize(input, ruleIndex, ruleStartIndex);
}<\n>
<endif>
protected virtual bool EvalPredicate( bool result, string predicate )
{
 dbg.SemanticPredicate( result, predicate );
 return result;
}<\n>
>>


ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, DebugEventSocketProxy.DefaultDebuggerPort, new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, int port,
RecognizerSharedState state )
 : base( input, state )
{
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>


ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input )
 : this( input, new Profiler(null), new RecognizerSharedState() )
{
}
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state )
```

```
 : base( input, dbg, state )
{
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}
<\n>
>>


/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : base( input, dbg, state )
{
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>( input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}> );}; separator="\n">
 <parserCtorBody()>
}<\n>
>>


ctorForPredefinedListener() ::= <<
<actions.(actionScope).ctorModifier; null="public"> <name>( <inputStreamType> input, IDebugEventListener dbg
)
 <@superClassRef>: base( input, dbg, new RecognizerSharedState() )<@end>
{
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <parserCtorBody()>
 <@finally()>
}<\n>
>>


createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, input.TreeAdaptor );<\n>
<else>
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port, null );<\n>
<endif>
```

```
DebugListener = proxy;
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

/*
 * Many of the following rules were merged into CSharp2.stg.
 */

@rule.preamble() ::= <<
if (RuleLevel == 0)
 DebugListener.Commence();
IncRuleLevel();
>>
//@rule.preamble() ::= <<
//try
//{
// dbg.EnterRule( GrammarFileName, "<ruleName>" );
// if ( RuleLevel == 0 )
// {
//  dbg.Commence();
// }
// IncRuleLevel();
// dbg.Location( <ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine> );<\n>
//>>

@rule.postamble() ::= <<
DecRuleLevel();
if (RuleLevel == 0)
 DebugListener.Terminate();
>>
//@rule.postamble() ::= <<
//dbg.Location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
//}
//finally
//{
// dbg.ExitRule( GrammarFileName, "<ruleName>" );
// DecRuleLevel();
// if ( RuleLevel == 0 )
// {
```

```
//  dbg.Terminate();
// }
//}<\n>
//>>


//@insertSynpreds.start() ::= "dbg.BeginBacktrack( state.backtracking );"
//@insertSynpreds.stop() ::= "dbg.EndBacktrack( state.backtracking, success );"


// Common debug event triggers used by region overrides below

//enterSubRule() ::= <<
//try
//{
// dbg.EnterSubRule( <decisionNumber> );<\n>
//>>

//exitSubRule() ::= <<
//}
//finally
//{
// dbg.ExitSubRule( <decisionNumber> );
//}<\n>
//>>

//enterDecision() ::= <<
//try
//{
// dbg.EnterDecision( <decisionNumber> );<\n>
//>>

//exitDecision() ::= <<
//}
//finally
//{
// dbg.ExitDecision( <decisionNumber> );
//}<\n>
//>>

//enterAlt(n) ::= "dbg.EnterAlt( <n> );<\n>"

// Region overrides that tell various constructs to add debugging triggers

//@block.predecision() ::= "<enterSubRule()><enterDecision()>"

//@block.postdecision() ::= "<exitDecision()>"

//@block.postbranch() ::= "<exitSubRule()>"
```

```
//@ruleBlock.predecision() ::= "<enterDecision()>"

//@ruleBlock.postdecision() ::= "<exitDecision()>"

//@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

//@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

//@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

//@positiveClosureBlock.predecision() ::= "<enterDecision()>"

//@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

//@positiveClosureBlock.earlyExitException() ::=
// "dbg.RecognitionException( eee<decisionNumber> );<\n>"

//@closureBlock.preloop() ::= "<enterSubRule()>"

//@closureBlock.postloop() ::= "<exitSubRule()>"

//@closureBlock.predecision() ::= "<enterDecision()>"

//@closureBlock.postdecision() ::= "<exitDecision()>"

//@altSwitchCase.prealt() ::= "<enterAlt(n=i)>"

//@element.prematch() ::=
// "dbg.Location( <it.line>, <it.pos> );"

//@matchSet.mismatchedSetException() ::=
// "dbg.RecognitionException( mse );"

//@dfaState.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//@dfaStateSwitch.noViableAltException() ::= "dbg.RecognitionException( nvae );"

//dfaDecision(decisionNumber,description) ::= <<
//try
//{
// isCyclicDecision = true;
// <super.dfaDecision(...)>
//}
//catch ( NoViableAltException nvae )
//{
// dbg.RecognitionException( nvae );
```

```
// throw nvae;
//}
//>>

//@cyclicDFA.errorMethod() ::= <<
//public override void Error( NoViableAltException nvae )
//{
// ((DebugParser)recognizer).dbg.RecognitionException( nvae );
//}
//>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
EvalPredicate(<pred>, "<description>")
>>
```

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* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/CSharp2/Dbg.stg
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/** Templates for building ASTs during normal parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* The situation is not too bad as rewrite (->) usage makes ^ and !
* invalid. There is no huge explosion of combinations.
*/
@rule.setErrorReturnValue() ::= <<
/* ASTParser rule.setErrorReturnValue */
retval.tree = (<ASTLabelType> *)[treeAdaptor errorNode:input From:retval.start To:[input LT:-1] Exception:re];
<! System.out.println("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token, label, elementIndex, terminalOptions) ::= <<
/* ASTParser tokenRef */
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
[treeAdaptor addChild:<label>_tree toTree:root_0];
<if(backtracking)>}<endif>
>>

/* ID! and output=AST (same as plain tokenRef) */
/* ASTParser tokenRefBang */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefBangAndListLabel */
<tokenRefBang(...)>
<listLabel(elem=label,...)>

```
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
/* ASTParser tokenRefRuleRootAndListLabel */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <%
/* ASTParser matchSet */
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
  [treeAdaptor addChild:<createNodeFromToken(...)> toTree:root_0 ];}, ...)>
%>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTParser matchRuleBlockSet */
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,terminalOptions, postmatchCode) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
/* ASTParser matchSetRuleRoot */
<if(label)>
```

```
<label>=(<labelType> *)[input LT:1]; /* matchSetRuleRoot */<\n>
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<createNodeFromToken(...)> old:root_0];}, ...)>
>>


// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRef */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
[treeAdaptor addChild:[<label> getTree] toTree:root_0];
>>


/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRoot */
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:[<label> getTree] old:root_0];
>>


/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefAndListLabel */
<ruleRef(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>


/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefBangAndListLabel */
<ruleRefBang(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>


/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>
```

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcard */
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
  [treeAdaptor addChild:[[treeAdaptor create:<label>] retain] toTree:root_0];
<if(backtracking)>}<endif>
>>

wildcardBang(token,label,elementIndex,terminalOptions) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
/* ASTParser wildcardRuleRoot */
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
  <label>_tree = [[treeAdaptor create:<label>] retain]
  root_0 = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_0];
<if(backtracking)>}<endif>
>>

createNodeFromToken(label,terminalOptions) ::= <<
/* ASTParser createNodeFromToken */
<if(terminalOptions.node)>
[<terminalOptions.node> new<terminalOptions.node>:<label>] <! new MethodNode(IDLabel) !>
<else>
(<ASTLabelType> *)[[treeAdaptor create:<label>] retain]
<endif>
>>

// straight from java cleanup ///
ruleCleanUp() ::= <<
/* ASTParser ruleCleanUp */
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<\n><endif>
  retval.tree = (<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0];
  [treeAdaptor setTokenBoundaries:retval.tree From:retval.start To:retval.stopToken];
<if(backtracking)>}<endif>
>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ObjC/ASTParser.stg
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/*
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*/
/** Template subgroup to add template rewrite output
* If debugging, then you'll also get STDbg.stg loaded.
*/

@returnScopeInterface.memVars() ::= <<
<@super.memVars()>
/* ST returnInterface.memVars */
ST *st;
>>

@returnScopeInterface.properties() ::= <<
<@super.properties()>
/* ST returnScope.properties */
@property (retain, getter=getST, setter=setST:) ST *st;
>>

@returnScopeInterface.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST AST returnScopeInterface.methodsDecl */
- (id) getTemplate;
- (NSString *) toString;
- (NSString *) description;
>>

```
@returnScopeInterface() ::= <<
/* ST returnScopeInterface */
@interface <returnScopeInterface.name> : ReturnScope {
<returnScopeInterface.memVars()>
}
<returnScopeInterface.properties()>

<returnScopeInterface.methods()>
@end
>>


@returnScopeImplementation.synthesize() ::= <<
<@super.synthesize()>
/* ST returnScope.synthesize */
@synthesize st;
>>


@returnScopeImplementation.methods() ::= <<
<@super.methods()>
/* ST returnScope.methods */
- (id) getTemplate { return st; }
- (NSString *) toString { return st==nil?nil:[st toString]; }
- (NSString *) description { [self toString]; }
>>


@returnScopeImplementation() ::= <<
@implementation <returnScopeImplementation.name>
<returnScopeImplementation.synthesize()>

<returnScopeImplementation.methods()>
@end
>>


/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
<@super.ruleReturnMembers()>
/* ST returnScope.ruleReturnMembers -- empty */
>>


@genericParserHeaderFile.memVars() ::= <<
<@super.memVars()>
/* ST genericParserHeaderFile.memVars -- empty now */
STGroup *templateLib; /* ST -- really a part of STAttrMap */
>>


@genericParserHeaderFile.properties() ::= <<
<@super.properties()>
/* ST genericParser.properties */
```

```
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
>>

@genericParserHeaderFile.methodsDecl() ::= <<
<@super.methodsDecl()>
/* ST genericParser.methodsDecl */
- init;
- (STGroup *) getTemplateLib;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
@end
>>

@genericParser.synthesize() ::= <<
<@super.synthesize()>
/* ST genericParserImplementation.synthesize */
@synthesize templateLib;
>>

@genericParser.methods() ::= <<
<@super.methods()>
/* ST genericParser.methods */

- (STGroup *)getTemplateLib
{
  return templateLib;
}

- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}

>>

@genericParser.members() ::= <<
<@super.members()>
STGroup *templateLib = [STGroup  newSTGroup:@"<name>Templates"];

- (STGroup *) getTemplateLib
{
 return templateLib;
}

- (void) setTemplateLib:(STGroup *) templateLib
{
 this.templateLib = templateLib;
}
```

```
/** allows convenient multi-value initialization:
*  "new STAttrMap().put(...).put(...)"
*/
/* REPLACE THIS STATIC CLASS
static class STAttrMap extends HashMap {
- (STAttrMap *) setObject:(id)aValue forKey:(NS*)String attrName
{
  [super setObject:value forKey:attrName];
  return self;
}
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName
{
  [super setObject:[NSNumber numberWithInteger:value] forKey:attrName];
  return self;
 }
}
*/
>>


@STAttrMap() ::= <<
/* -------- ST start STAttrMap ------------ */
<@STAttrMap.interface()>
<@STAttrMap.implementation()>
/* -------- ST end STAttrMap ------------ */
>>


@STAttrMap.interface() ::= <<
/* -------- ST start STAttrMap.interface ------------ */
@interface STAttrMap : HashMap {
/*   <@STAttrMap.memVars()> */
  STGroup *templateLib;
}

/*    <@STAttrMap.properties()> */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* <@STAttrMap.methodsDecl()> */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
@end
/* -------- ST end STAttrMap.interface ------------ */
>>


@STAttrMap.implementation() ::= <<
/* -------- ST start STAttrMap.implementation ------------ */
/** allows convenient multi-value initialization:
```

```
*  "new STAttrMap().put(...).put(...)"
*/
@implementation STAttrMap
@synthesize templateLib;

<@STAttrMap.methods()>
@end
/* -------- ST end STAttrMap.implementation ------------ */
>>


@STAttrMap.memVars() ::= <<
/* -------- ST start STAttrMap.memVars ------------ */
  STGroup *templateLib;
/* -------- ST end STAttrMap.memVars ------------ */
>>


@STAttrMap.properties() ::= <<
/* -------- ST start STAttrMap.properties ------------ */
@property (retain, getter=getTemplateLib, setter=setTemplateLib:) STGroup *templateLib;
/* -------- ST end STAttrMap.properties ------------ */
>>


@STAttrMap.methodsDecl() ::= <<
/* -------- ST start STAttrMap.methodsDecl ------------ */
- (id) init;
- (STAttrMap *) setObject:(id)value forKey:(NSString *)attrName;
- (STAttrMap *) setObjectWithInt:(NSInteger)value forKey:(NSString *)attrName;
- (void) setTemplateLib:(STGroup *)aTemplateLib;
- (STGroup *) getTemplateLib;
/* -------- ST end STAttrMap.methodsDecl ------------ */
>>


@STAttrMap.methods() ::= <<
/* -------- ST start STAttrMap.methods ------------ */
- (id) init
{
  self = [super initWithLen:16];
  if ( self != nil ) {
     templateLib = [STGroup newSTGroup:"<name>Templates"];
  }
  return self;
}


- (STAttrMap *) setObject:(id)aValue forKey:(NSString *)aAttrName
{
  [super setObject:aValue forKey:aAttrName];
  return self;
}
```

```
- (STAttrMap *) setObjectWithInt:(NSInteger)aValue forKey:(NSString *)aAttrName
{
  [super setObject:[NSNumber numberWithInteger:aValue] forKey:aAttrName];
  return self;
}
- (void) setTemplateLib:(STGroup *)aTemplateLib
{
  templateLib = aTemplateLib;
}

- (STGroup *)getTemplateLib
{
  return templateLib;
}
/* -------- ST end STAttrMap.methods ------------ */
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ST ruleRefAndListLable */
<ruleRef(...)>
<listLabel(elem=[label getTemplate,...]>
>>

rewriteTemplate(alts) ::= <<
/* -------- ST start rewriteTemplate ------------ */
// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
  <alts:rewriteTemplateAlt(); separator="else ">
  <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
/* -------- ST end rewriteTemplate ------------ */
>>

replaceTextInLine() ::= <<
/* -------- ST start replaceTextInLine ------------ */
<if(TREE_PARSER)>
[[(TokenRewriteStream *)input getTokenStream]
  replaceFromIndex:[[input getTreeAdaptor] getTokenStartIndex:retval.start]
      ToIndex:[[input getTreeAdaptor] getTokenStopIndex:retval.start]
        Text:retval.st];
<else>
```

```
[(TokenRewriteStream *)input)
    replaceFromIndex:[((CommonToken *)retval.start) getTokenIndex]
         ToIndex:[[input LT:-1] getTokenIndex]
            Text:retval.st];
<endif>
/* -------- ST end replaceTextInLine ------------ */
>>


rewriteTemplateAlt() ::= <<
/* -------- ST start rewriteTemplateAlt ------------ */
/* ST <it.description> */
<if(it.pred)>
if (<it.pred>) {
  retval.st = <it.alt>;
}<\n>
<else>
{
  retval.st = <it.alt>;
}<\n>
<endif>
/* -------- ST end rewriteTemplateAlt ------------ */
>>


rewriteEmptyTemplate(alts) ::= <<
nil;
>>


/** Invoke a template with a set of attribute name/value pairs.
*  Set the value of the rule's template *after* having set
*  the attributes because the rule's template might be used as
*  an attribute to build a bigger template; you get a self-embedded
*  template.
*/
rewriteExternalTemplate(name,args) ::= <<
/* -------- ST start rewriteExternalTemplate ------------ */
[templateLib getInstanceOf:@"<name>"
<if(args)>[[STAttrMap newSTAttrMap] <args:{a | setObject:<a.value> forKey:@"<a.name>"]}><endif>]
/* -------- ST end rewriteExternalTemplate ------------ */
>>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
/* -------- ST start rewriteIndirectTemplate ------------ */
[templateLib getInstanceOf:<expr>
<if(args)> [[STAttrMap newSTAttrMap]<args:{a | setObject:<a.value> forKey:@"<a.name>"]}>]
<else>]<endif>
/* -------- ST end rewriteIndirectTemplate ------------ */
>>
```

```
/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <<
/* -------- ST start rewriteInlineTemplate ------------ */
STGroup *templateLib;
templateLib.templates = [STAttrMap newSTAttrMap];
<if(args)> [templateLib.templates <args:{a | setObject:<a.value> forKey:@"<a.name>"];}><endif>
[ST newST:templateLib template:@"<template>"];
/* -------- ST end rewriteInlineTemplate ------------ */
>>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
/* -------- ST start rewriteAction ------------ */
<action>
/* -------- ST end rewriteAction ------------ */
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
/* -------- ST start actionSetAttribute ------------ */
[[ST attributes] setObject:<expr> forKey:@"<attrName>"];
<![<st> setAttribute:<expr> name:@"<attrName>"];!>
/* -------- ST end actionSetAttribute ------------ */
>>


/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
/* -------- ST start actionStringConstructor ------------ */
[ST newSTWithTemplate:<stringExpr>]
/* -------- ST end actionStringConstructor ------------ */
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/ST.stg
No license file was found, but licenses were detected in source scan.

```
javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than an atomic type
]

// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"true",
 "false":"false",
 default:"false"
]

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
       docComment, recognizer,
       name, tokens, tokenNames, rules, cyclicDFAs,
     bitsets, buildTemplate, buildAST, rewriteMode, profile,
     backtracking, synpreds, memoize, numRules,
     fileName, ANTLRVersion, generatedTimestamp, trace,
```

```
    scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
import org.antlr.runtime.*;
<if(TREE_PARSER)>
import org.antlr.runtime.tree.*;
<endif>
import java.util.Stack;
import java.util.List;
import java.util.ArrayList;
<if(backtracking)>
import java.util.Map;
import java.util.HashMap;
<endif>
<@end>

<docComment>
@SuppressWarnings("all")
<recognizer>

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
    superClass="Lexer") ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
 <tokens:{it | public static final int <it.name>=<it.type>;}; separator="\n">
 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>
 public <superClass>[] getDelegates() {
  return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 public <grammar.recognizerName>() {} <! needed by subclasses !>
 public <grammar.recognizerName>(CharStream input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
```

```
 public <grammar.recognizerName>(CharStream input, RecognizerSharedState state<grammar.delegators:{g|,
<g.recognizerName> <g:delegateName()>}>) {
 super(input,state);
<if(memoize)>
<if(grammar.grammarIsRoot)>
 state.ruleMemo = new HashMap[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
 <grammar.delegators:
  {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
 @Override public String getGrammarFileName() { return "<fileName>"; }

<if(filterMode)>
 <filteringNextToken()>
<endif>
 <rules; separator="\n\n">

 <synpreds:{p | <lexerSynpred(p)>}>

 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 * for matches.  No error can be generated upon error; just rewind, consume
 * a token and then try again.  backtracking needs to be set as well.
 * Make rule memoization happen only at levels above 1 as we start mTokens
 * at backtracking==1.
 */
filteringNextToken() ::= <<
@Override
public Token nextToken() {
 while (true) {
  if ( input.LA(1)==CharStream.EOF ) {
   Token eof = new CommonToken(input,Token.EOF,
       Token.DEFAULT_CHANNEL,
       input.index(),input.index());
   eof.setLine(getLine());
   eof.setCharPositionInLine(getCharPositionInLine());
   return eof;
```

```
   }
  state.token = null;
 state.channel = Token.DEFAULT_CHANNEL;
  state.tokenStartCharIndex = input.index();
  state.tokenStartCharPositionInLine = input.getCharPositionInLine();
  state.tokenStartLine = input.getLine();
 state.text = null;
  try {
  int m = input.mark();
  state.backtracking=1; <! means we won't throw slow exception !>
  state.failed=false;
  mTokens();
  state.backtracking=0;
  <! mTokens backtracks with synpred at backtracking==2
   and we set the synpredgate to allow actions at level 1. !>
  if ( state.failed ) {
   input.rewind(m);
   input.consume(); <! advance one char and try again !>
  }
  else {
   emit();
   return state.token;
  }
 }
  catch (RecognitionException re) {
  // shouldn't happen in backtracking mode, but...
  reportError(re);
  recover(re);
  }
 }
}

@Override
public void memoize(IntStream input,
 int ruleIndex,
 int ruleStartIndex)
{
if ( state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

@Override
public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "state.backtracking==0"
```

filteringActionGate() ::= "state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends <@superClassName><superClass><@end> {
<if(grammar.grammarIsRoot)>
 public static final String[] tokenNames = new String[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ", wrap="\n\t\t">
 };
<endif>
 <tokens:{it |public static final int <it.name>=<it.type>;}; separator="\n">

 // delegates
 <grammar.delegates: {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 public <superClass>[] getDelegates() {
  return new <superClass>[] {<grammar.delegates: {g|<g:delegateName()>}; separator = ", ">};
 }

 // delegators
 <grammar.delegators:
  {g|public <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|public <g.recognizerName> gParent;}>

 <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<@members>
 <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
 public <grammar.recognizerName>(<inputStreamType> input<grammar.delegators:{g|, <g.recognizerName>
<g:delegateName()>}>) {
  this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>);
 }
 public <grammar.recognizerName>(<inputStreamType> input, RecognizerSharedState
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
  super(input, state);
  <parserCtorBody()>
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
  <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
<@end>

```
  @Override public String[] getTokenNames() { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
  @Override public String getGrammarFileName() { return "<fileName>"; }


 <members>


 <rules; separator="\n\n">


<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 // Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 public <returnType(ruleDescriptor)> <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
throws <ruleDescriptor.throwsSpec; separator=", "> { <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ru
leDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>); \}}; separator="\n">


 <synpreds:{p | <synpred(p)>}>


 <cyclicDFAs:{dfa | protected DFA<dfa.decisionNumber> dfa<dfa.decisionNumber> = new
DFA<dfa.decisionNumber>(this);}; separator="\n">
 <cyclicDFAs:cyclicDFA(); separator="\n\n"><! dump tables for all DFA !>


 <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
     words64=it.bits)>}; separator="\n">
}
>>


parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new HashMap[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
 {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>


parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TokenStream", superClass,
        labelType, members, "Token",
        false, ASTLabelType)>
>>


/** How to generate a tree parser; same as parser except the input
```

```
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>}
        ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TreeNodeStream", superClass,
        labelType, members, "Node",
        filterMode, ASTLabelType)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 * rules created for syntactic predicates.  As they never have return values
 * nor parameters etc..., just give simplest possible method.  Don't do
 * any of the normal memoization stuff in here either; it's a waste.
 * As predicates cannot be inlined into the invoking rule, they need to
 * be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
public final void <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>}; separator=", "> {
 <ruleLabelDefs()>
<if(trace)>
 traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try {
  <block>
 }
 finally {
  traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
 }
<else>
 <block>
<endif>
}
// $ANTLR end <ruleName>
>>


synpred(name) ::= <<
public final boolean <name>() {
 state.backtracking++;
 <@start()>
 int start = input.mark();
 try {
  <name>_fragment(); // can never throw exception
```

```
  } catch (RecognitionException re) {
   System.err.println("impossible: "+re);
  }
 boolean success = !state.failed;
 input.rewind(start);
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) {
<returnStatement(({<ruleReturnValue()>}))> }
<endif>
>>

/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnStatement(({<ruleReturnValue()>}))><endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true;
<returnStatement(({<ruleReturnValue()>}))>}<endif>
>>

/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
// <fileName>:<description>
<if(isPredefinedRewriteRule.(ruleName) && filterMode && buildAST)>
@Override
<endif>
public final <returnType(ruleDescriptor)> <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws
<ruleDescriptor.throwsSpec:{x|<x>}; separator=", "> {
```

```
<if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
<ruleScopeSetUp()>
<ruleDeclarations()>
<ruleLabelDefs()>
<ruleDescriptor.actions.init>
<@preamble()>
try {
 <ruleMemoization(name=ruleName)>
 <block>
 <ruleCleanUp()>
 <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re) {
  reportError(re);
  recover(input,re);
  <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally {
  // do for sure before leaving
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
 }
<@postamble()>
 <returnStatement(({<ruleReturnValue()>}), false)>
}
// $ANTLR end "<ruleName>"
>>

returnStatement(returnValue, force=true) ::= <%
<if(!isEmptyString.(returnValue))>
 return <returnValue>;
<elseif(force)>
 return;
<endif>
%>
```

```
catch(decl,action) ::= <<
catch (<e.decl>) {
 <e.action>
}
>>


ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.start = input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.index();
<endif>
>>


ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>



ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |<labelType> <it.label.text>=null;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it |<labelType> <it.label.text>=null;}; separator="\n"
```

```
>
<ruleDescriptor.charLabels:{it |int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
 :{it |List\<Object> list_<it.label.text>=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
public final void m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>) throws RecognitionException
{
 <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 try {
<if(nakedBlock)>
```

```
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
<else>
 int _type = <ruleName>;
 int _channel = DEFAULT_TOKEN_CHANNEL;
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
 <ruleCleanUp()>
 state.type = _type;
 state.channel = _channel;
 <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally {
 // do for sure before leaving
 <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
 <ruleScopeCleanUp()>
 <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
@Override
public void mTokens() throws RecognitionException {
 <block>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
```

```
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
 <alts:{a | <altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 <decision>
```

```
<@postdecision()>
switch (alt<decisionNumber>) {
<alts:{a | <altSwitchCase(i,a)>}>
default :
  if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
  <ruleBacktrackFailure()>
  EarlyExitException eee = new EarlyExitException(<decisionNumber>, input);
  <@earlyExitException()>
  throw eee;
  }
  cnt<decisionNumber>++;
  }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
while (true) {
  int alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
<alts:{a | <altSwitchCase(i,a)>}>
default :
  break loop<decisionNumber>;
  }
}
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
```

```
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
case <altNum> :
 <@prealt()>
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>match(input,<token>,FOLLOW_<token>_in_<ruleName><elementIndex
>); <checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList\<Object>();
```

```
list_<label>.add(<elem>);
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
<endif>
if ( <s> ) {
 input.consume();
 <postmatchCode>
<if(!LEXER)>
 state.errorRecovery=false;
<endif>
 <if(backtracking)>state.failed=false;<endif>
}
else {
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 <@mismatchedSetException()>
<if(LEXER)>
 recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
 !>
```

```
<endif>
}
>>


matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
int <label>Start = getCharIndex();
match(<string>); <checkRuleBacktrackFailure()>
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL, <label>Start,
getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=<castToLabelType("input.LT(1)")>;
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
```

```
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);
state._fsp--;
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>


/** A lexer rule reference.
 *
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> = new <labelType>(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
```

```
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
int <label>StartLine<elementIndex> = getLine();
int <label>StartCharPos<elementIndex> = getCharPositionInLine();
match(EOF); <checkRuleBacktrackFailure()>
<labelType> <label> = new <labelType>(input, EOF, Token.DEFAULT_CHANNEL, <label>Start<elementIndex>,
getCharIndex()-1);
<label>.setLine(<label>StartLine<elementIndex>);
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>);
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                  ::= "int <recRuleArg()>"
recRuleArg()                     ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()         ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
```

```
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(pred,description)>) ) {
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else {
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
<endif>
>>


nvaExceptionWrapperMap ::= [
 "1":"wrapNvaExceptionForK1",
 "2":"wrapNvaExceptionForK2",
 default:"wrapNvaExceptionForKN"
]

wrapNvaExceptionForK1(exceptionCode) ::= <<
<exceptionCode>
>>


wrapNvaExceptionForK2(exceptionCode) ::= <<
int nvaeMark = input.mark();
try {
 input.consume();
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>


wrapNvaExceptionForKN(exceptionCode) ::= <<
```

```
int nvaeMark = input.mark();
try {
 for (int nvaeConsume = 0; nvaeConsume \< <k> - 1; nvaeConsume++) {
  input.consume();
 }
 <exceptionCode>
} finally {
 input.rewind(nvaeMark);
}
>>
```

/** Same as a normal DFA state except that we don't examine lookahead
 * for the bypass alternative. It delays error detection but this
 * is faster, smaller, and more what people expect. For (X)? people
 * expect "if (LA(1)==X) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
>>

/** A DFA state that is actually the loopback decision of a closure
 * loop. If end-of-token (EOT) predicts any of the targets then it
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(<k>);
<edges; separator="\nelse ">
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
 alt<decisionNumber>=<eotPredictsAlt>;
}
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression. If the expression is satisfied,
 * enter to the target state. To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */

```
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
 <targetState>
}
>>


// F i x e d   D F A   (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 *  decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 <(nvaExceptionWrapperMap.(k))({NoViableAltException nvae =
 new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);
<@noViableAltException()>
throw nvae;})>
<endif>
}
>>


dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
 <edges; separator="\n">
}
>>


dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;
<endif>
}
>>


dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
 <targetState>
```

```
        }
     break;
     >>


     // C y c l i c   D F A

     /** The code to initiate execution of a cyclic DFA; this is used
     *  in the rule to predict an alt just like the fixed DFA case.
     *  The <name> attribute is inherited via the parser, lexer, ...
     */
     dfaDecision(decisionNumber,description) ::= <<
     alt<decisionNumber> = dfa<decisionNumber>.predict(input);
     >>


     /* Dump DFA tables as run-length-encoded Strings of octal values.
     * Can't use hex as compiler translates them before compilation.
     * These strings are split into multiple, concatenated strings.
     * Java puts them back together at compile time thankfully.
     * Java cannot handle large static arrays, so we're stuck with this
     * encode/decode approach.  See analysis and runtime DFA for
     * the encoding methods.
     */
     cyclicDFA(dfa) ::= <<
     static final String DFA<dfa.decisionNumber>_eotS =
      "<dfa.javaCompressedEOT; wrap="\"+\n\t\"">";
     static final String DFA<dfa.decisionNumber>_eofS =
      "<dfa.javaCompressedEOF; wrap="\"+\n\t\"">";
     static final String DFA<dfa.decisionNumber>_minS =
      "<dfa.javaCompressedMin; wrap="\"+\n\t\"">";
     static final String DFA<dfa.decisionNumber>_maxS =
      "<dfa.javaCompressedMax; wrap="\"+\n\t\"">";
     static final String DFA<dfa.decisionNumber>_acceptS =
      "<dfa.javaCompressedAccept; wrap="\"+\n\t\"">";
     static final String DFA<dfa.decisionNumber>_specialS =
      "<dfa.javaCompressedSpecial; wrap="\"+\n\t\"">}>";
     static final String[] DFA<dfa.decisionNumber>_transitionS = {
      <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
     };

     static final short[] DFA<dfa.decisionNumber>_eot =
     DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eotS);
     static final short[] DFA<dfa.decisionNumber>_eof =
     DFA.unpackEncodedString(DFA<dfa.decisionNumber>_eofS);
     static final char[] DFA<dfa.decisionNumber>_min =
     DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
     static final char[] DFA<dfa.decisionNumber>_max =
     DFA.unpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
     static final short[] DFA<dfa.decisionNumber>_accept =
```

```
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
static final short[] DFA<dfa.decisionNumber>_special =
DFA.unpackEncodedString(DFA<dfa.decisionNumber>_specialS);
static final short[][] DFA<dfa.decisionNumber>_transition;

static {
 int numStates = DFA<dfa.decisionNumber>_transitionS.length;
 DFA<dfa.decisionNumber>_transition = new short[numStates][];
 for (int i=0; i\<numStates; i++) {
  DFA<dfa.decisionNumber>_transition[i] = DFA.unpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
 }
}

protected class DFA<dfa.decisionNumber> extends DFA {

 public DFA<dfa.decisionNumber>(BaseRecognizer recognizer) {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
  this.accept = DFA<dfa.decisionNumber>_accept;
  this.special = DFA<dfa.decisionNumber>_special;
  this.transition = DFA<dfa.decisionNumber>_transition;
 }
 @Override
 public String getDescription() {
  return "<dfa.description>";
 }
 <@errorMethod()>
<if(dfa.specialStateSTs)>
 @Override
 public int specialStateTransition(int s, IntStream _input) throws NoViableAltException {
  <if(LEXER)>
  IntStream input = _input;
  <endif>
  <if(PARSER)>
  TokenStream input = (TokenStream)_input;
  <endif>
  <if(TREE_PARSER)>
  TreeNodeStream input = (TreeNodeStream)_input;
  <endif>
  int _s = s;
  switch ( s ) {
  <dfa.specialStateSTs:{state |
  case <i0> : <! compressed special state numbers 0..n-1 !>
   <state>}; separator="\n">
```

```
  }
<if(backtracking)>
 if (state.backtracking>0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae =
  new NoViableAltException(getDescription(), <dfa.decisionNumber>, _s, input);
 error(nvae);
 throw nvae;
 }
<endif>
}
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
int LA<decisionNumber>_<stateNumber> = input.LA(1);
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
int index<decisionNumber>_<stateNumber> = input.index();
input.rewind();
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);
<endif>
if ( s>=0 ) return s;
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}
>>

/** An edge pointing at end-of-token; essentially matches any char;
*  always jump to the target.
*/
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;
>>


// D F A   E X P R E S S I O N S
```

```
andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >= <lower>
&& input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected static class <scope.name>_scope {
 <scope.attributes:{it |<it.decl>;}; separator="\n">
}
protected Stack\<<scope.name>_scope> <scope.name>_stack = new Stack\<<scope.name>_scope>();
<endif>
<endif>
```

```
>>

returnStructName(r) ::= "<r.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
%>

/** Generate the Java type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<returnScopeBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>

/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
```

```
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public static class <ruleDescriptor:returnStructName()> extends <returnScopeBaseType()> {
 <if(scope)><scope.attributes:{it |public <it.decl>;}; separator="\n"><endif>
 <@ruleReturnMembers()>
};
<endif>
>>


returnScopeBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope
%>


parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"


scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name>
<else>
<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1).<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack.elementAt(<index>).<attr.name> =<expr>;
<else>
<scope>_stack.peek().<attr.name> =<expr>;
<endif>
<endif>
%>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
```

```
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>


returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>;
<else>
<attr.name> =<expr>;
<endif>
%>


/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.getText():null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.getType():0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.getLine():0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.getCharPositionInLine():0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.getChannel():0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.getTokenIndex():0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.start})>):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?(<castToLabelType({<scope>.stop})>):null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=null?((<ASTLabelType>)<scope>.getTree()):null)"
```

```
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toString(<scope>.start,<scope>.stop):null)
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?((StringTemplate)<scope>.getTemplate()):null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
 "(<scope>!=null?<scope>.getType():0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
 "(<scope>!=null?<scope>.getLine():0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
 "(<scope>!=null?<scope>.getCharPositionInLine():-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
 "(<scope>!=null?<scope>.getChannel():0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
 "(<scope>!=null?<scope>.getTokenIndex():0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
 "(<scope>!=null?<scope>.getText():null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
 "(<scope>!=null?Integer.valueOf(<scope>.getText()):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(<castToLabelType(\"retval.start\")>)"
rulePropertyRef_stop(scope,attr) ::= "(<castToLabelType(\"retval.stop\")>)"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
```

```
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "Integer.valueOf(<scope>.getText())"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
%>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static final BitSet <name> = new BitSet(new long[]{<words64:{it |<it>L};separator=",">});
>>

codeFileExtension() ::= ".java"

true_value() ::= "true"
false_value() ::= "false"

isEmptyString ::= [
 "" : true,
 default : false
]

isTrue ::= [
 "true" : true,
 default : false
]

isDefaultLabelType ::= [
```

```
  "Token" : true,
 default : false
]

isPredefinedRewriteRule ::= [
 "topdown" : true,
 "bottomup" : true,
 default : false
]

castToLabelType(value) ::= <%
<if(!isDefaultLabelType.(labelType))>
(<labelType>)
<endif>
<value>
%>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/Java.stg
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 * Copyright (c) 2011 Terence Parr
 * All rights reserved.
 *
 * Conversion to C#:
 * Copyright (c) 2011 Sam Harwell, Pixel Mine, Inc.
 * All rights reserved.
 *
 * Redistribution and use in source and binary forms, with or without
 * modification, are permitted provided that the following conditions
 * are met:
 * 1. Redistributions of source code must retain the above copyright
 *    notice, this list of conditions and the following disclaimer.
 * 2. Redistributions in binary form must reproduce the above copyright
 *    notice, this list of conditions and the following disclaimer in the
 *    documentation and/or other materials provided with the distribution.
 * 3. The name of the author may not be used to endorse or promote products
 *    derived from this software without specific prior written permission.
 *
 * THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
 * IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
 * OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
 * IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
 * INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
 * NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
 * DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
```

```
csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment, recognizer,
   name, tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member 'Type_or_Member'
#pragma warning disable 1591
// CLS compliance checking will not be performed on 'type' because it is not visible from outside this assembly.
#pragma warning disable 3019

<actions.(actionScope).header>

<@imports>
```

```
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
<@end>
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>

} // namespace <actions.(actionScope).namespace>
<endif>
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>},
   rewriteElementType={}, ASTLabelType={}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>

 <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
 {
  OnCreated();
```

```
    }

    <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
     : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
    {
    }

    <actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
     : base(input, state)
    {
<if(memoize)>
<if(grammar.grammarIsRoot)>
     state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];<\n><! index from 1..n !>
<endif>
<endif>
     <grammar.directDelegates:
      {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
     <grammar.delegators:
      {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
     <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

     OnCreated();
    }
    public override string GrammarFileName { get { return "<fileName>"; } }

<if(grammar.hasDelegates)>
    public override <lexerInputStreamType()> CharStream
    {
     get
     {
      return base.CharStream;
     }
     set
     {
      base.CharStream = value;
      <grammar.directDelegates:
       {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
      <grammar.delegators:
       {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
      <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
     }
    }

<if(grammar.delegates)>
```

```
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>

<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>


 partial void OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 <rules; separator="\n">

 <insertLexerSynpreds(synpreds)>

 #region DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion

}
>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at backtracking==1.
 */
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  {
```

```
 if (input.LA(1) == CharStreamConstants.EndOfFile)
 {
  IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index, input.Index);
  eof.Line = Line;
  eof.CharPositionInLine = CharPositionInLine;
  return eof;
 }
 state.token = null;
 state.channel = TokenChannels.Default;
 state.tokenStartCharIndex = input.Index;
 state.tokenStartCharPositionInLine = input.CharPositionInLine;
 state.tokenStartLine = input.Line;
 state.text = null;
 try
 {
 int m = input.Mark();
 state.backtracking=1;<! means we won't throw slow exception !>
 state.failed=false;
 mTokens();
 state.backtracking=0;
 <! mTokens backtracks with synpred at backtracking==2
    and we set the synpredgate to allow actions at level 1. !>
 if (state.failed)
 {
  input.Rewind(m);
  input.Consume();<! advance one char and try again !>
 }
 else
 {
  Emit();
  return state.token;
 }
 }
 catch (RecognitionException re)
 {
 // shouldn't happen in backtracking mode, but...
 ReportError(re);
 Recover(re);
 }
 }
}

public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
{
 if (state.backtracking > 1)
  base.Memoize(input, ruleIndex, ruleStartIndex);
}
```

```
public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
{
 if (state.backtracking > 1)
  return base.AlreadyParsedRule(input, ruleIndex);

 return false;
}
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
```

```
        }

<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>

 public override string[] TokenNames { get { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }

 <members>

 partial void OnCreated();
 partial void EnterRule(string ruleName, int ruleIndex);
 partial void LeaveRule(string ruleName, int ruleIndex);

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>)<!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">
```

```
protected override void InitDFAs()
{
base.InitDFAs();
<cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
}

<cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
#endregion DFA
<endif>

<if(bitsets)>
#region Follow sets
private static class Follow
{
<bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
}
#endregion Follow sets
<endif>
}
>>

@genericParser.members() ::= <<
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
: this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
: base(input, state)
{
<if(grammar.directDelegates)>
<grammar.directDelegates:
{g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
<grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
<endif>
<if(grammar.delegators)>
<last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
<parserCtorBody()>
OnCreated();
}
```

```
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>


parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new System.Collections.Generic.Dictionary\<int,
int>[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>


parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>}, labelType="IToken",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", filterMode=false, ...)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
      numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
      members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<

partial void EnterRule_<ruleName>_fragment();
```

```
partial void LeaveRule_<ruleName>_fragment();

// $ANTLR start <ruleName>
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
<ruleLabelDefs(...)>
EnterRule_<ruleName>_fragment();
EnterRule("<ruleName>_fragment", <ruleDescriptor.index>);
TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
try
{
 <block>
}
finally
{
 TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
 LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
 LeaveRule_<ruleName>_fragment();
}
}
// $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>

insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
bool success = false;
state.backtracking++;
<@start()>
try { DebugBeginBacktrack(state.backtracking);
int start = input.Mark();
try
{
 fragment();
}
catch ( RecognitionException re )
{
 System.Console.Error.WriteLine("impossible: "+re);
}
success = !state.failed;
input.Rewind(start);
```

```
 } finally { DebugEndBacktrack(state.backtracking, success); }
<@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}
#endregion Synpreds
<endif>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>


ruleWrapperMap ::= [
 "bottomup":{<ruleWrapperBottomup()>},
 "topdown":{<ruleWrapperTopdown()>},
 default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { <if(buildAST)>return
<endif>bottomup(); }
<endif>
>>


ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Topdown() { <if(buildAST)>return
<endif>topdown(); }
<endif>
>>


/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
```

```
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(ruleDescriptor.returnScope)>
partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
 <ruleLabelDefs(...)>
 <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
  <ruleMemoization(name=ruleName)>
  <block>
  <ruleCleanUp()>
  <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re)
 {
  ReportError(re);
  Recover(input,re);
  <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally
 {
```

```
TraceOut("<ruleName>", <ruleDescriptor.index>);
LeaveRule("<ruleName>", <ruleDescriptor.index>);
LeaveRule_<ruleName>();
<memoize()>
<ruleScopeCleanUp()>
<finally>
}
DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
} finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
<@postamble()>
<returnFromRule()><\n>
}
// $ANTLR end "<ruleName>"
>>


// imported grammars need to have internal rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>internal<endif>
>>


// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>public<endif>
>>


catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>


ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new
<returnType(ruleDescriptor)>(<if(ruleDescriptor.returnScope.attributes)>this<endif>);
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
>>
```

```
ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new <it>_scope(this));<it>_scopeInit(<it>_stack.Peek());};
separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope(this));<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>


ruleLabelDefs(ruleDescriptor, labelType, ASTLabelType, rewriteElementType) ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<ruleDescriptor.tokenListLabels
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
 :{it|List\<<ASTLabelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
 :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
 ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
 :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>


returnFromRule() ::= <%
```

```
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!> retval
<endif>
<endif>
<endif>
;
%>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
<endif>
<endif>
>>


memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>


/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

partial void EnterRule_<ruleName>();
partial void LeaveRule_<ruleName>();

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
 <ruleScopeSetUp()>
 <ruleDeclarations()>
```

```
 try
 {
<if(nakedBlock)>
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
<else>
  int _type = <ruleName>;
  int _channel = DefaultTokenChannel;
  <ruleMemoization(name=ruleName)>
  <lexerRuleLabelDefs()>
  <ruleDescriptor.actions.init>
  <block>
  <ruleCleanUp()>
  state.type = _type;
  state.channel = _channel;
  <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
 TraceOut("<ruleName>", <ruleDescriptor.index>);
  LeaveRule("<ruleName>", <ruleDescriptor.index>);
  LeaveRule_<ruleName>();
  <ruleScopeCleanUp()>
  <memoize()>
 }
}
// $ANTLR end "<ruleName>"
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
 <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
```

```
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
```

```
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
<alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
   goto loop<decisionNumber>;

  <ruleBacktrackFailure()>
  EarlyExitException eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
  DebugRecognitionException(eee<decisionNumber>);
  <@earlyExitException()>
  throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
}
loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
```

```
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, false<!<decision.dfa.hasSynPred>!>);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}

loop<decisionNumber>:
 ;

} finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
```

```
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>
```

/** What to emit when there is no rewrite. For auto build
 * mode, does nothing.
 */
```
noRewrite(rewriteBlockLevel, treeLevel) ::= ""
```

// E L E M E N T S

/** Dump the elements one per line */
```
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>
```

/** match a token optionally with a label in front */
```
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>
```

/** ids+=ID */
```
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>
```

```
listLabel(label,elem) ::= <<
#error The listLabel template should not be used with this target.<\n>
>>
```

```
listLabelElem(label,elem,elemType) ::= <<
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>
```

/** match a character */
```
charRef(char,label) ::= <<
<if(label)>
```

```
<label> = input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(mse);
 throw mse;
<else>
 throw mse;
 <! use following code to make it recover inline; remove throw mse;
 recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
 !>
<endif>
}<\n>
>>

matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
```

```
<postmatchCode><\n>
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>


matchSetLabel() ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>


matchRuleBlockSet ::= matchSet


matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
%>


wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match . wildcard in lexer */
```

```
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name; format="id">(<args;
separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>


/** A lexer rule reference.
 *
 * The 'rule' argument was the target rule name, but now
 * is type Rule, whose toString is same: the rule name.
 * Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
```

```
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>


// used for left-recursive rules
recRuleDefArg()                     ::= "int <recRuleArg()>"
recRuleArg()                  ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
```

```
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
 <ruleBacktrackFailure()>
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
 throw nvae;
<endif>
}
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>


/** A DFA state that is actually the loopback decision of a closure
```

```
*  loop.  If end-of-token (EOT) predicts any of the targets then it
*  should act like a default clause (i.e., no error can be generated).
*  This is used only in the lexer so that for ('a')* on the end of a rule
*  anything other than 'a' predicts exiting.
*/
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
```

```
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
 {
 <targetState>
 }
 break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
try
{
```

```
  alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
 throw;
}
>>


/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
 */
cyclicDFA(dfa) ::= <<
private class DFA<dfa.decisionNumber> : DFA
{
 private const string DFA<dfa.decisionNumber>_eotS =
  "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_eofS =
  "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_minS =
  "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS =
  {
  <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[] DFA<dfa.decisionNumber>_eof =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
```

```
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
private static readonly short[][] DFA<dfa.decisionNumber>_transition;

static DFA<dfa.decisionNumber>()
{
 int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
 DFA<dfa.decisionNumber>_transition = new short[numStates][];
 for ( int i=0; i \< numStates; i++ )
 {
  DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
 }
}

public DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>,
SpecialStateTransitionHandler specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
 : base(specialStateTransition)
<endif>
{
 this.recognizer = recognizer;
 this.decisionNumber = <dfa.decisionNumber>;
 this.eot = DFA<dfa.decisionNumber>_eot;
 this.eof = DFA<dfa.decisionNumber>_eof;
 this.min = DFA<dfa.decisionNumber>_min;
 this.max = DFA<dfa.decisionNumber>_max;
 this.accept = DFA<dfa.decisionNumber>_accept;
 this.special = DFA<dfa.decisionNumber>_special;
 this.transition = DFA<dfa.decisionNumber>_transition;
}

public override string Description { get { return "<dfa.description>"; } }

public override void Error(NoViableAltException nvae)
{
 DebugRecognitionException(nvae);
}
}<\n>
<if(dfa.specialStateSTs)>
private int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
<if(LEXER)>
IIntStream input = _input;
<endif>
<if(PARSER)>
ITokenStream input = (ITokenStream)_input;
<endif>
```

```
<if(TREE_PARSER)>
ITreeNodeStream input = (ITreeNodeStream)_input;
<endif>
int _s = s;
s = -1;
<! pull these outside the switch cases to save space on locals !>
int LA<dfa.decisionNumber>_1 = input.LA(1);
int index<dfa.decisionNumber>_1 = input.Index;
switch (_s)
{
<dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
<state>}; separator="\n">

default:
 break;
 }

 if (s >= 0)
 return s;

<if(backtracking)>
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
 }
<endif>
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges; separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
 }
>>
```

```
/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>



// D F A   E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
>>
```

```
// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">

 public <scope.name>_scope(<grammar.recognizerName> grammar) { OnCreated(grammar); }
 partial void OnCreated(<grammar.recognizerName> grammar);
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit( <scope.name>_scope scope )
{
 <scope.actions.scopeinit>
}
<else>
partial void <scope.name>_scopeInit( <scope.name>_scope scope );
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter( <scope.name>_scope scope )
{
 <scope.actions.scopeafter>
}
<else>
partial void <scope.name>_scopeAfter( <scope.name>_scope scope );
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>

globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>

returnStructName(it) ::= "<it.name>_return"

returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
```

```
 <ruleReturnBaseType()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>


/** Generate the C# type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
 void
<endif>
%>


delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
default(<typeName>)
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(label.referencedRule)> <label.label.text> = <initValue(ruleLabelType(label.referencedRule))>;
%>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> sealed partial class
<ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
```

```
}
<endif>
>>


ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>


@returnScope.ruleReturnMembers() ::= <<
public <ruleDescriptor:returnStructName()>(<grammar.recognizerName> grammar) {OnCreated(grammar);}
partial void OnCreated(<grammar.recognizerName> grammar);
>>


parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>


parameterAttributeRef(attr) ::= <<
<attr.name; format="id">
>>


parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>


scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>
```

/** $x is either global scope or x is rule with dynamic scope; refers
* to stack itself not top of stack. This is useful for predicates
* like {$function.Count>0 && $function::name.Equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"

// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

```
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.Template:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
  "(<scope>!=null?<scope>.Type:0)"

lexerRuleLabelPropertyRef_line(scope,attr) ::=
  "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr) ::=
  "(<scope>!=null?<scope>.CharPositionInLine:-1)"

lexerRuleLabelPropertyRef_channel(scope,attr) ::=
  "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
  "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
  "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
  "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
```

```
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int.Parse(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
}
<else>
<action>
<endif>
%>

@execAction.indentedAction() ::= <<
 <action>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>
```

codeFileExtension() ::= ".cs"

true_value() ::= "true"
false_value() ::= "false"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/CSharp3.stg
No license file was found, but licenses were detected in source scan.

/** Templates for building ASTs during normal parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* The situation is not too bad as rewrite (->) usage makes ^ and !

```
*  invalid. There is no huge explosion of combinations.
*/

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
    <block>
<else>
<block>
<endif>
<endif>
>>

@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
```

```
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>

// RULE REF AST
```

```
/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0, <label>.tree)})>
>>


/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"


/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>


/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>


/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>


/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0, <label>_tree)
})>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
```

```
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>


createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
<endif>
%>


ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python3/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 * hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
 */
parserMembers() ::= <<
protected DebugTreeAdaptor adaptor =
  new DebugTreeAdaptor(null,new CommonTreeAdaptor());
public void setTreeAdaptor(TreeAdaptor adaptor) {
  this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
}
public TreeAdaptor getTreeAdaptor() {
  return adaptor;
}<\n>
>>


parserCtorBody() ::= <<
>>


createListenerAndHandshake() ::= <<
<super.createListenerAndHandshake()>
>>


ctorForPredefinedListener() ::= <<
>>


@rewriteElement.pregen() ::= ""
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/ASTDbg.stg
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*/

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/ObjC/Dbg.stg
No license file was found, but licenses were detected in source scan.

/*
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```
/*
 * Template group file for the Objective C code generator.
 * Heavily based on Java.stg
 *
 * Written by Kay Roepke <kroepke(at)classdump.org>
 * Modified by Alan Condit <acondit(at)ipns.com>
 *
 * This file is part of ANTLR and subject to the same license as ANTLR itself.
 */


objcTypeInitMap ::= [
  "int"      : "0",       // Integers     start out being 0
  "long"     : "0",       // Longs        start out being 0
  "float"    : "0.0",     // Floats       start out being 0
  "double"    : "0.0",      // Doubles      start out being 0
  "BOOL"      : "NO",        // Booleans     start out being Antlr ObjC for false
  "byte"     : "0",       // Bytes        start out being 0
  "short"    : "0",       // Shorts       start out being 0
  "char"     : "0",       // Chars        start out being 0
  "id"       : "nil",     // ids          start out being nil
  default     : "nil"       // anything other than an atomic type
]


// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
 "True":"true",
 "False":"false",
 "true":"YES",
 "false":"NO",
 default:"NO"
]



className() ::= "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>"
leadIn(type) ::=
<<
/** \file
 * This <type> file was generated by $ANTLR version <ANTLRVersion>
 *
 *    - From the grammar source file : <fileName>
 *    -                On : <generatedTimestamp>
<if(LEXER)>
 *    -            for the lexer : <name>Lexer
```

```
<endif>
<if(PARSER)>
*     -              for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
*     -              for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* ObjC language generator and runtime by Alan Condit, acondit|hereisanat|ipns|dotgoeshere|com.
*
*
>>


/** The overall file structure of a recognizer; stores methods for rules
*   and cyclic DFAs plus support code.
*/
outputFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
        ) ::=
<<
```

```
<leadIn("OBJC source")>
*/
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<! <if(actions.(actionScope).header)>
/* =============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* =============================================================================
*/
<endif> !>


/* --------------------------------------
* Include the ANTLR3 generated header file.
*/
#import "<name><!<if(LEXER)>Lexer<else><if(TREE_PARSER)>Tree<endif>Parser<endif>!>.h"
<actions.(actionScope).postinclude>
/* -------------------------------------- */

<docComment>

<if(literals)>
/** String literals used by <name> that we must do things like MATCHS() with.
* C will normally just lay down 8 bit characters, and you can use L"xxx" to
* get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
* we perform this little trick of defining the literals as arrays of UINT32
* and passing in the address of these.
*/
<literals:{it | static ANTLR3_UCHAR  lit_<i>[]  = <it>;}; separator="\n">

<endif>

/* ==================================================================================== */
/* =============================================================================
* Start of recognizer
*/
<recognizer>
>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
       PARSER,
       TREE_PARSER,
       actionScope,
       actions,
       docComment,
```

```
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
    ) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
<actions.(actionScope).preincludes>
/* =============================================================================
* Standard antlr OBJC runtime definitions
*/
#import \<Cocoa/Cocoa.h>
#import \<ANTLR/ANTLR.h>
/* End of standard antlr3 runtime definitions
* =============================================================================
*/
<actions.(actionScope).includes>
<@end>

<if(LEXER)>
<lexerHeaderFile(...)>
<endif>
<if(PARSER)>
<parserHeaderFile(...)>
<endif>
<if(TREE_PARSER)>
<treeParserHeaderFile(...)>
<endif>
```

```
<docComment>
>>

lexerHeaderFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass="Lexer"
        ) ::=
<<

<if(actions.(actionScope).header)>
/* ==========================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ==========================================================================
*/
<endif>

/* Start cyclicDFAInterface */
<cyclicDFAs:cyclicDFAInterface()>

#pragma mark Rule return scopes Interface start
<rules:{rule |
<rule.ruleDescriptor:{ruleDescriptor | <returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>
#pragma mark Rule return scopes Interface end
```

```
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
/* interface lexer class */
@interface <className()> <@superClassName: <superClass><@end> { // line 283
<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
/* ObjC start of actions.lexer.memVars */
<actions.lexer.memVars>
/* ObjC end of actions.lexer.memVars */
}
+ (void) initialize;
+ (<className()> *)new<className()>WithCharStream:(id\<CharStream>)anInput;
/* ObjC start actions.lexer.methodsDecl */
<actions.lexer.methodsDecl>
/* ObjC end actions.lexer.methodsDecl */
<rules:{rule |
- (<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)
<if(!rule.ruleDescriptor.isSynPred)>m<rule.ruleName><else><rule.ruleName>_fragment<endif>
<if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:parameterScope()><endif>; };
separator="\n"><\n>
@end /* end of <className()> interface */<\n>
>>


headerReturnScope(ruleDescriptor) ::= "<returnScopeInterface(...)>"
headerReturnType(ruleDescriptor) ::= <<
<if(LEXER)>
<if(!r.ruleDescriptor.isSynPred)>
void
<else>
<ruleDescriptor:returnType()>
<endif>
<else>
<ruleDescriptor:returnType()>
<endif>
>>
// Produce the lexer output
lexer(  grammar,
    name,
    tokens,
    scopes,
    rules,
    numRules,
```

```
        filterMode,
        labelType="CommonToken",
        superClass="Lexer"
        ) ::= <<
<cyclicDFAs:cyclicDFA()>

/** As per Terence: No returns for lexer rules! */
<!
#pragma mark Rule return scopes start
<rules:{rule | <rule.ruleDescriptor:{ruleDescriptor |
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>
}>
#pragma mark Rule return scopes end
!>
@implementation <grammar.recognizerName> // line 330

+ (void) initialize
{
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
}

+ (NSString *) tokenNameForType:(NSInteger)aTokenType
{
  return [[self getTokenNames] objectAtIndex:aTokenType];
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>WithCharStream:(id\<CharStream>)anInput
{
  return [[<grammar.recognizerName> alloc] initWithCharStream:anInput];
}

- (id) initWithCharStream:(id\<CharStream>)anInput
{
  self = [super initWithCharStream:anInput State:[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1]];
  if ( self != nil ) {
<if(memoize)>
    if ( state.ruleMemo == nil ) {
      state.ruleMemo = [[RuleStack newRuleStackWithSize:<numRules>+1] retain];
    }
    if ( [state.ruleMemo count] == 0 ) {
      // initialize the memoization cache - the indices are 1-based in the runtime code!
      <! [state.ruleMemo addObject:[NSNull null]];    /* dummy entry to ensure 1-basedness. */ !>
      for (NSInteger i = 0; i \< <numRules>; i++) {
        [state.ruleMemo addObject:[HashRule newHashRuleWithLen:17]];
      }
    }
<endif>
```

```
    <synpreds:{pred | <lexerSynpred(name=pred)>};separator="\n">
    <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
    <actions.lexer.init>
  }
  return self;
}


- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
<actions.lexer.dealloc>
  [super dealloc];
}


/* ObjC Start of actions.lexer.methods */
<actions.lexer.methods>
/* ObjC end of actions.lexer.methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */


<if(actions.lexer.reset)>
- (void) reset
{
  <actions.lexer.reset>
  [super reset];
}
<endif>


<if(filterMode)>
<filteringNextToken()>
<endif>
/* Start of Rules */
<rules; separator="\n">


@end /* end of <grammar.recognizerName> implementation line 397 */
>>


/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at backtracking==1.
 */
filteringNextToken() ::= <<
- (id\<Token>) nextToken
{
```

```
    while (YES) {
        if ( [input LA:1] == CharStreamEOF ) {
            return [<labelType> eofToken];
        }
        state.token = nil;
        state.channel = TokenChannelDefault;
        state.tokenStartCharIndex = input.index;
        state.tokenStartCharPositionInLine = input.charPositionInLine;
        state.tokenStartLine = input.line;
        state.text = nil;
        @try {
            NSInteger m = [input mark];
            state.backtracking = 1; /* means we won't throw slow exception */
            state.failed = NO;
            [self mTokens];
            state.backtracking = 0;
            /* mTokens backtracks with synpred at backtracking==2
               and we set the synpredgate to allow actions at level 1. */
            if ( state.failed ) {
                [input rewind:m];
                [input consume]; /* advance one char and try again */
            } else {
                [self emit];
                return state.token;
            }
        }
        @catch (RecognitionException *re) {
            // shouldn't happen in backtracking mode, but...
            [self reportError:re];
            [self recover:re];
        }
    }
}

- (void)memoize:(id\<IntStream\>)anInput
      RuleIndex:(NSInteger)ruleIndex
     StartIndex:(NSInteger)ruleStartIndex
{
  if ( state.backtracking > 1 ) [super memoize:anInput RuleIndex:ruleIndex StartIndex:ruleStartIndex];
}

- (BOOL)alreadyParsedRule:(id\<IntStream\>)anInput RuleIndex:(NSInteger)ruleIndex
{
  if ( state.backtracking > 1 ) return [super alreadyParsedRule:anInput RuleIndex:ruleIndex];
  return NO;
}
>>
```

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

parserHeaderFile(LEXER,
      PARSER,
      TREE_PARSER,
      actionScope,
      actions,
      docComment,
      recognizer,
      name,
      tokens,
      tokenNames,
      rules,
      cyclicDFAs,
      bitsets,
      buildTemplate,
      profile,
      backtracking,
      synpreds,
      memoize,
      numRules,
      fileName,
      ANTLRVersion,
      generatedTimestamp,
      trace,
      scopes,
      literals,
      superClass="Parser"
) ::= <<
/* parserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TokenStream>",...)>
>>

treeParserHeaderFile(LEXER,
      PARSER,
      TREE_PARSER,
      actionScope,
      actions,
      docComment,
      recognizer,
      name,
      tokens,
      tokenNames,
      rules,
      cyclicDFAs,
      bitsets,

```
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        literals,
        superClass="TreeParser"
        ) ::= <<
/* treeParserHeaderFile */
<genericParserHeaderFile(inputStreamType="id\<TreeNodeStream>",...)>
>>

genericParserHeaderFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals,
        inputStreamType
        ) ::=
<<
<if(actions.(actionScope).header)>
```

```
/* ============================================================================
* This is what the grammar programmer asked us to put at the top of every file.
*/
<actions.(actionScope).header>
/* End of Header action.
* ============================================================================
*/
<endif>

#ifndef ANTLR3TokenTypeAlreadyDefined
#define ANTLR3TokenTypeAlreadyDefined
typedef enum {
  ANTLR_EOF = -1,
  INVALID,
  EOR,
  DOWN,
  UP,
  MIN
} ANTLR3TokenType;
#endif

<cyclicDFAs:cyclicDFAInterface()>
#pragma mark Tokens
#ifndef TOKENLISTAlreadyDefined
#define TOKENLISTAlreadyDefined 1
#ifdef EOF
#undef EOF
#endif
<tokens:{it | #define <it.name> <it.type>}; separator="\n">
#endif
#pragma mark Dynamic Global Scopes globalAttributeScopeInterface
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInterface(scope=it)><endif>}>
#pragma mark Dynamic Rule Scopes ruleAttributeScopeInterface
<rules:{rule |
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeInterface(scope=ruleDescriptor.ruleScope)>}>}>
#pragma mark Rule Return Scopes returnScopeInterface
<rules:{rule |<rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeInterface(scope=ruleDescriptor.returnScope)>}>}>

/* Interface grammar class */
@interface <className()> <@superClassName> : <superClass><@end> { /* line 572 */
#pragma mark Dynamic Rule Scopes ruleAttributeScopeDecl
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeDecl(scope=rule.ruleDescriptor.ruleScope)>}>
#pragma mark Dynamic Global Rule Scopes globalAttributeScopeMemVar
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeMemVar(scope=it)><endif>}><\n>
/* ObjC start of actions.(actionScope).memVars */
<actions.(actionScope).memVars>
/* ObjC end of actions.(actionScope).memVars */
```

```
/* ObjC start of memVars */
<@memVars()>
/* ObjC end of memVars */

<cyclicDFAs:{dfa | DFA<dfa.decisionNumber> *dfa<dfa.decisionNumber>;}; separator="\n">
<synpreds:{pred | SEL <pred>Selector;}; separator="\n">
}

/* ObjC start of actions.(actionScope).properties */
<actions.(actionScope).properties>
/* ObjC end of actions.(actionScope).properties */
/* ObjC start of properties */
<@properties()>
/* ObjC end of properties */

+ (void) initialize;
+ (<className()> *) new<className()>:(<inputStreamType>)aStream;
/* ObjC start of actions.(actionScope).methodsDecl */
<actions.(actionScope).methodsDecl>
/* ObjC end of actions.(actionScope).methodsDecl */

/* ObjC start of methodsDecl */
<@methodsDecl()>
/* ObjC end of methodsDecl */

<rules:{rule |
-
(<rule.ruleDescriptor:{ruleDescriptor|<returnType()>}>)<if(!rule.ruleDescriptor.isSynPred)><rule.ruleName><else
><rule.ruleName>_fragment<endif><if(rule.ruleDescriptor.parameterScope)><rule.ruleDescriptor.parameterScope:
parameterScope()><endif>; }; separator="\n"><\n>

@end /* end of <className()> interface */<\n>
>>

parser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    bitsets,
    ASTLabelType="CommonTree",
    superClass="Parser",
    labelType="CommonToken",
    members={<actions.parser.members>}
    ) ::= <<
<genericParser(inputStreamType="id\<TokenStream>", rewriteElementType="Token", ...)>
```

```
>>

/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    globalAction,
    rules,
    numRules,
    bitsets,
    filterMode,
    labelType={<ASTLabelType>},
    ASTLabelType="CommonTree",
    superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
    members={<actions.treeparser.members>}
    ) ::= <<
<genericParser(inputStreamType="id\<TreeNodeStream>", rewriteElementType="Node", ...)>
>>

/** How to generate a parser */
genericParser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    cyclicDFAs,        // parser init -- initializes the DFAs
    bitsets,
    labelType,
    ASTLabelType,
    superClass,
    members,
    filterMode,
    rewriteElementType,
    inputStreamType
    ) ::= <<
<cyclicDFAs:cyclicDFA()>

#pragma mark Bitsets
<bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>

#pragma mark Dynamic Global globalAttributeScopeImplementation
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeImplementation(scope=it)><endif>}>
```

```
#pragma mark Dynamic Rule Scopes ruleAttributeScopeImplementation
<rules:{rule |
<rule.ruleDescriptor:{ ruleDescriptor | <ruleAttributeScopeImplementation(scope=ruleDescriptor.ruleScope)>}>}>

#pragma mark Rule Return Scopes returnScopeImplementation
<rules:{rule | <rule.ruleDescriptor:{ ruleDescriptor |
<returnScopeImplementation(scope=ruleDescriptor.returnScope)>}>}>

@implementation <grammar.recognizerName>  // line 637

/* ObjC start of ruleAttributeScope */
#pragma mark Dynamic Rule Scopes ruleAttributeScope
<rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScope()>}>
/* ObjC end of ruleAttributeScope */
#pragma mark global Attribute Scopes globalAttributeScope
/* ObjC start globalAttributeScope */
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScope()><endif>}>
/* ObjC end globalAttributeScope */
/* ObjC start actions.(actionScope).synthesize */
<actions.(actionScope).synthesize>
/* ObjC start synthesize() */
<@synthesize()>

+ (void) initialize
{
  #pragma mark Bitsets
  <bitsets:{it | <bitsetInit(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}>
  [BaseRecognizer setTokenNames:[[AMutableArray arrayWithObjects:@"\<invalid>", @"\<EOR>",
@"\<DOWN>", @"\<UP>", <tokenNames:{it | @<it>}; separator=", ", wrap="\n ">, nil] retain]];
  [BaseRecognizer setGrammarFileName:@"<fileName>"];
  <synpreds:{pred | <synpred(pred)>}>
}

+ (<grammar.recognizerName> *)new<grammar.recognizerName>:(<inputStreamType>)aStream
{
<if(PARSER)>
  return [[<grammar.recognizerName> alloc] initWithTokenStream:aStream];
<else><! TREE_PARSER !>
  return [[<grammar.recognizerName> alloc] initWithStream:aStream];
<endif>
}

<if(PARSER)>
- (id) initWithTokenStream:(<inputStreamType>)aStream
{
  self = [super initWithTokenStream:aStream State:[[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
```

```
   if ( self != nil ) {
<else><! TREE_PARSER !>
- (id) initWithStream:(<inputStreamType>)aStream
{
  self = [super initWithStream:aStream State:[[RecognizerSharedState
newRecognizerSharedStateWithRuleLen:<numRules>+1] retain]];
  if ( self != nil ) {
<endif>
    <! <parserCtorBody()> !>
    <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = [DFA<dfa.decisionNumber>
newDFA<dfa.decisionNumber>WithRecognizer:self];}; separator="\n">
    <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeInit(scope=it)><endif>}>
    <rules:{rule | <rule.ruleDescriptor.ruleScope:ruleAttributeScopeInit()>}>
    /* start of actions-actionScope-init */
    <actions.(actionScope).init>
    /* start of init */
    <@init()>
  }
  return self;
}

- (void) dealloc
{
  <cyclicDFAs:{dfa | [dfa<dfa.decisionNumber> release];}; separator="\n">
  <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDealloc(scope=it)><endif>}>
  <actions.(actionScope).dealloc>
  <@dealloc()>
  [super dealloc];
}

/* ObjC start actions.(actionScope).methods */
<actions.(actionScope).methods>
/* ObjC end actions.(actionScope).methods */
/* ObjC start methods() */
<@methods()>
/* ObjC end methods() */
/* ObjC start rules */
<rules; separator="\n">
/* ObjC end rules */

@end /* end of <grammar.recognizerName> implementation line 692 */<\n>
>>

parserCtorBody() ::= <<
<if(memoize)> /* parserCtorBody */
<if(grammar.grammarIsRoot)>
state.ruleMemo = [[RuleStack newRuleStack:<numRules>+1] retain];<\n> <! index from 1..n !>
<endif>
```

```
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>_fragment
- (void) <ruleName>_fragment
{
  <ruleLabelDefs()>
  <if(trace)>
    [self traceIn:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  @try {
    <block>
  }
  @finally {
    [self traceOut:\@"<ruleName>_fragment" Index:<ruleDescriptor.index>];
  }
<else>
  <block>
<endif>
} // $ANTLR end <ruleName>_fragment
>>


synpred(name) ::= <<
SEL <name>Selector = @selector(<name>_fragment);
<! // $ANTLR start <name>
- (BOOL) <name>
{
  state.backtracking++;
  <@start()>
  NSInteger start = [input mark];
  @try {
    [self <name>_fragment]; // can never throw exception
  }
  @catch (RecognitionException *re) {
    NSLog(@"impossible: %@\n", re.name);
  }
  BOOL success = (state.failed == NO);
  [input rewind:start];
```

```
  <@stop()>
  state.backtracking--;
  state.failed=NO;
  return success;
} // $ANTLR end <name> <\n> !>
>>


lexerSynpred(name) ::= <<
<synpred(name)>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if ( state.backtracking > 0 && [self alreadyParsedRule:input RuleIndex:<ruleDescriptor.index>] ) { return
<ruleReturnValue()>; }
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if (backtracking)>if ( state.failed ) return <ruleReturnValue()>;<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if ( state.backtracking > 0 ) { state.failed = YES; return <ruleReturnValue()>; }<\n><endif>
>>


/** How to generate code for a rule.
*  The return type aggregates are declared in the header file (headerFile template)
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<

/*
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
- (<returnType()>) <ruleName><ruleDescriptor.parameterScope:parameterScope()>
{
  <if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
  <if(trace)>NSLog(@"enter <ruleName> %@ failed=%@ backtracking=%d", [input LT:1],
(state.failed==YES)?@"YES":@"NO", state.backtracking);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  @try {
    <ruleMemoization(name=ruleName)>
```

```
            <ruleLabelDefs()>
            <block>
            <ruleCleanUp()>
            <(ruleDescriptor.actions.after):execAction()>
        }
<if(exceptions)>
    <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else><if(!emptyRule)><if(actions.(actionScope).rulecatch)>
    <actions.(actionScope).rulecatch>
<else>
    @catch (RecognitionException *re) {
        [self reportError:re];
        [self recover:input Exception:re];
        <@setErrorReturnValue()>
    }<\n>
<endif><endif><endif>
    @finally {
        <if(trace)>[self traceOut:@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
        <memoize()>
        <ruleScopeCleanUp()>
        <finally>
    }
    <@postamble()>
    return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>


finalCode(finalBlock) ::= <<
{
    <finalBlock>
}
>>


catch(decl,action) ::= <<
@catch (<e.decl>) {
    <e.action>
}
>>


ruleDeclarations() ::= <<
/* ruleDeclarations */
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval = [<ruleDescriptor:returnStructName()> new<ruleDescriptor:returnStructName()>];
[retval setStart:[input LT:1]];<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
```

```
}>
<endif>
<if(memoize)>
NSInteger <ruleDescriptor.name>_StartIndex = input.index;
<endif>
>>

ruleScopeSetUp() ::= <<
/* ruleScopeSetUp */
<ruleDescriptor.useScopes:{it | [<it>_stack push:[<it>_Scope new<it>_Scope]];}>
<ruleDescriptor.ruleScope:{it | [<it.name>_stack push:[<it.name>_Scope new<it.name>_Scope]];}>
>>

ruleScopeCleanUp() ::= <<
/* ruleScopeCleanUp */
<ruleDescriptor.useScopes:{it | [<it>_stack pop];}; separator="\n">
<ruleDescriptor.ruleScope:{it | [<it.name>_stack pop];}; separator="\n">
>>

ruleLabelDefs() ::= <%
/* ruleLabelDefs entry */<"\n">
<[ruleDescriptor.tokenLabels, ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |<labelType> *<it.label.text> = nil;}; separator="\n"><"\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | AMutableArray *list_<it.label.text> = nil;}; separator="\n"><"\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n"><"\n">
<ruleDescriptor.ruleListLabels:{ll|ParserRuleReturnScope *<ll.label.text> = nil;}; separator="\n"><"\n">
%>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<labelType> *<it.label.text>=nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |NSInteger <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]:{it |AMutableArray *list_<it.label.text>=nil; }; separator="\n">
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
```

```
<endif>
<endif>
<endif>
%>


ruleCleanUp() ::= <<
/* token+rule list labels */
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{it |[list_<it.label.text> release];}; separator="\n">
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
[retval setStop:[input LT:-1]];<\n>
<endif><endif>
>>


memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) [self memoize:input RuleIndex:<ruleDescriptor.index>
StartIndex:<ruleDescriptor.name>_StartIndex];
<endif><endif>
>>


/** How to generate a rule in the lexer; naked blocks are used for
*   fragment rules.
*/
lexerRule(ruleName, nakedBlock, ruleDescriptor, block, memoize) ::= <<
// $ANTLR start "<ruleName>"
- (void)
m<ruleName><if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope:parameterScope(scope=it)><endif>
{
  //<if(trace)>[self traceIn:\@"<ruleName>" Index:<ruleDescriptor.index>];<endif>
  <if(trace)>NSLog(@"enter <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
     [input LA:1],
     self.line,
     self.charPositionInLine,
     (state.failed==YES) ? @"YES" : @"NO",
     state.backtracking);
  <endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  @try {
<if(nakedBlock)>
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block><\n>
<else>
```

```
        NSInteger _type = <ruleName>;
        NSInteger _channel = TokenChannelDefault;
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block>
        <ruleCleanUp()>
        state.type = _type;
        state.channel = _channel;
        <(ruleDescriptor.actions.after):execAction()>
<endif>
    }
    @finally {
        //<if(trace)>[self traceOut:[NSString stringWithFormat:@"<ruleName> %d\n",
<ruleDescriptor.index>]];<endif>
        <if(trace)>NSLog(@"exit <ruleName> %C line=%d:%d failed=%@ backtracking=%d",
                [input LA:1], self.line, self.charPositionInLine,
                (state.failed==YES) ? @"YES" : @"NO", state.backtracking);<endif>
        <ruleScopeCleanUp()>
        <memoize()>
    }
    return;
}
/* $ANTLR end "<ruleName>" */
>>


/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
- (void) mTokens
{
    <block><\n>
}
>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> // block
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
```

```
    <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> //ruleblock
NSInteger alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // ruleBlockSingleAlt
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description> // blockSingleAlt
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description> // positiveClosureBlock
NSInteger cnt<decisionNumber> = 0;
<decls>
<@preloop()>
do {
  NSInteger alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
```

```
        <alts:{a | <altSwitchCase(i, a)>}>
        default :
          if ( cnt<decisionNumber> >= 1 )
            goto loop<decisionNumber>;
          <ruleBacktrackFailure()>
          EarlyExitException *eee =
            [EarlyExitException newException:input decisionNumber:<decisionNumber>];
          <@earlyExitException()>
          @throw eee;
      }
    cnt<decisionNumber>++;
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>


positiveClosureBlockSingleAlt ::= positiveClosureBlock


/** A (..)* block with 0 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
<decls>
<@preloop()>
do {
  NSInteger alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
    <alts:{a | <altSwitchCase(i, a)>}>
    default :
        goto loop<decisionNumber>;
  }
} while (YES);
loop<decisionNumber>: ;
<@postloop()>
>>


closureBlockSingleAlt ::= closureBlock


/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
```

```
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum, alt) ::= <<
case <altNum> : ;
  <@prealt()>
  <alt>
  break;<\n>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description> // alt
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>


/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""


// E L E M E N T S


/** Dump the elements one per line */
element(e) ::= << <@prematch()><\n><e.el><\n> >>


/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=(<labelType> *)<endif>[self match:input TokenType:<token>
Follow:FOLLOW_<token>_in_<ruleName><elementIndex>]; <checkRuleBacktrackFailure()>
>>


/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


listLabel(label,elem) ::= <<
if (list_<label> == nil) list_<label> = [[AMutableArray arrayWithCapacity:5] retain];
[list_<label> addObject:<elem>];<\n>
>>
```

```
/** match a character */
charRef(char,label) ::= <<
<if(label)>NSInteger <label> = [input LA:1];<\n><endif>
[self matchChar:<char>]; <checkRuleBacktrackFailure()><\n>
>>


/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)><label> = [input LA:1];<\n><endif>
[self matchRangeFromChar:<a> to:<b>]; <checkRuleBacktrackFailure()>
>>


/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> = [input LA:1];<\n>
<else>
<label> = (<labelType> *)[input LT:1]; /* matchSet */<\n>
<endif><endif>
if (<s>) {
  [input consume];
  <postmatchCode>
<if(!LEXER)>
  [state setIsErrorRecovery:NO];
<endif>
  <if(backtracking)>state.failed = NO;<\n><endif>
} else {
  <ruleBacktrackFailure()>
  MismatchedSetException *mse = [MismatchedSetException newException:nil stream:input];
  <@mismatchedSetException()>
<if(LEXER)>
<if(label)>
  mse.c = <label>;
<endif>
  [self recover:mse];
  @throw mse;
<else>
  @throw mse;
  <! use following code to make it recover inline; remove throw mse;
  [self recoverFromMismatchedSet:input exception:mse follow:FOLLOW_set_in_<ruleName><elementIndex>]; !>
<endif>
}<\n>
>>


matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
```

```
<matchSet(...)>
<listLabel(elem=label,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
NSInteger <label>Start = input.index;
[self matchString:<string>]; <checkRuleBacktrackFailure()>
NSInteger StartLine<elementIndex> = self.line;
NSInteger <label>StartCharPos<elementIndex> = self.charPositionInLine;
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start Stop:input.index] retain];
[self setLine:<label>StartLine<elementIndex>];
[self setCharPositionInLine:<label>StartCharPos<elementIndex>];
<else>
[self matchString:<string>]; <checkRuleBacktrackFailure()><\n>
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label> = (<labelType> *)[input LT:1];<\n>
<endif>
[self matchAny:input]; <checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
NSInteger <label> = [input LA:1];<\n>
<endif>
[self matchAny]; <checkRuleBacktrackFailure()><\n>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
```

```
*  same: the rule name.  Now though you can access full rule
*  descriptor stuff.
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ruleRef */
[self pushFollow:FOLLOW_<rule.name>_in_<ruleName><elementIndex>];
<if(label)><label> = <endif>[self <if(scope)><scope:delegateName()>.<endif><rule.name><if(args)>:<first(args)>
<rest(args):{ a | arg<i>:<rest(args)>}; separator=" "><endif>];<\n>
[self popFollow];
<checkRuleBacktrackFailure()><\n>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>


/** A lexer rule reference.
*
* The 'rule' argument was the target rule name, but now
* is type Rule, whose toString is same: the rule name.
* Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self m<rule.name><if(args)>:<args; separator=" :"><endif>]; <checkRuleBacktrackFailure()><\n>
<label> = [[<labelType> newToken:input Type:TokenTypeInvalid Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self <if(scope)><scope:delegateName()>.<endif>m<rule.name><if(args)>:<args; separator=" :"><endif>];
<checkRuleBacktrackFailure()><\n>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
NSInteger <label>Start<elementIndex> = input.index;
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
```

```
<labelType> <label> = [[<labelType> newToken:input Type:TokenTypeEOF Channel:TokenChannelDefault
Start:<label>Start<elementIndex> Stop:input.index-1] retain];
<label>.line = self.line;
<else>
[self matchChar:CharStreamEOF]; <checkRuleBacktrackFailure()><\n>
<endif>
>>


// used for left-recursive rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                  ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()          ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)     ::= "$<name>=$<src>.<name>;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == DOWN ) {
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
}
<else>
  [self match:input TokenType:DOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:UP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
  <ruleBacktrackFailure()>
  @throw [FailedPredicateException newException:@"<ruleName>" predicate:@"<description>" stream:input];
}
>>


// F i x e d  D F A  (if-then-else)


dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
else {
```

```
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = LA<decisionNumber>_<stateNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}
>>


/** Same as a normal DFA state except that we don't examine lookahead
 * for the bypass alternative.  It delays error detection but this
 * is faster, smaller, and more what people expect.  For (X)? people
 * expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];<\n>
<edges; separator="\nelse ">
>>


/** A DFA state that is actually the loopback decision of a closure
 * loop.  If end-of-token (EOT) predicts any of the targets then it
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:<k>];
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif><endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"


/** A simple edge with an expression.  If the expression is satisfied,
 * enter to the target state.  To handle gated productions, we may
 * have to evaluate some predicates for this edge.
```

```
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>


// F i x e d  D F A  (switch case)


/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
unichar charLA<decisionNumber> = [input LA:<k>];
switch (charLA<decisionNumber>) {
  <edges; separator="\n"><\n>
default: ;
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  NoViableAltException *nvae = [NoViableAltException newException:<decisionNumber> state:<stateNumber>
stream:input];
  nvae.c = charLA<decisionNumber>;
  <@noViableAltException()>
  @throw nvae;<\n>
<endif>
}<\n>
>>


dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>]) { // dfaOptionalBlockStateSwitch
  <edges; separator="\n"><\n>
}<\n>
>>


dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ([input LA:<k>]) { // dfaLoopbackStateSwitch
  <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber> = <eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>


dfaEdgeSwitch(labels, targetState) ::= <<
```

```
<labels:{it | case <it>: ;}; separator="\n">
  {
  <targetState>
  }
  break;
>>


// C y c l i c  D F A


/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = [dfa<decisionNumber> predict:input];
>>


/** Used in headerFile */
cyclicDFAInterface(dfa) ::= <<
#pragma mark Cyclic DFA interface start DFA<dfa.decisionNumber>
@interface DFA<dfa.decisionNumber> : DFA {
}
+ (DFA<dfa.decisionNumber> *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer
*)theRecognizer;
- initWithRecognizer:(BaseRecognizer *)recognizer;
@end /* end of DFA<dfa.decisionNumber> interface  */<\n>
#pragma mark Cyclic DFA interface end DFA<dfa.decisionNumber><\n>
>>


/** Used in lexer/parser implementation files */
/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
#pragma mark Cyclic DFA implementation start DFA<dfa.decisionNumber>

@implementation DFA<dfa.decisionNumber>
const static NSInteger dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
  {<dfa.eot; wrap="\n    ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
  {<dfa.eof; wrap="\n    ", separator=",", null="-1">};
const static unichar dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
  {<dfa.min; wrap="\n    ", separator=",", null="-1">};
```

```
const static unichar dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
  {<dfa.max; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
  {<dfa.accept; wrap="\n     ", separator=",", null="-1">};
const static NSInteger dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
  {<dfa.special; wrap="\n     ", separator=",", null="-1">};

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     nil

<dfa.edgeTransitionClassMap.keys:{ table |
const static NSInteger dfa<dfa.decisionNumber>_T<i0>[] =
{
   <table; separator=", ", wrap="\n ", null="-1">
\};
}; null="">

const static NSInteger *dfa<dfa.decisionNumber>_transition[] =
{
  <dfa.transitionEdgeTables:{whichTable|dfa<dfa.decisionNumber>_T<whichTable>}; separator=", ", wrap="\n",
null="nil">
};

+ (DFA<dfa.decisionNumber> *) newDFA<dfa.decisionNumber>WithRecognizer:(BaseRecognizer *)aRecognizer
{
  return [[[DFA<dfa.decisionNumber> alloc] initWithRecognizer:aRecognizer] retain];
}

- (id) initWithRecognizer:(BaseRecognizer *) theRecognizer
{
  self = [super initWithRecognizer:theRecognizer];
  if ( self != nil ) {
    decisionNumber = <dfa.decisionNumber>;
    eot = dfa<dfa.decisionNumber>_eot;
    eof = dfa<dfa.decisionNumber>_eof;
    min = dfa<dfa.decisionNumber>_min;
    max = dfa<dfa.decisionNumber>_max;
    accept = dfa<dfa.decisionNumber>_accept;
    special = dfa<dfa.decisionNumber>_special;
    transition = dfa<dfa.decisionNumber>_transition;
  }
  return self;
}

<if(dfa.specialStateSTs)>
/* start dfa.specialStateSTs */
- (NSInteger) specialStateTransition:(NSInteger)s Stream:(id\<IntStream\>)anInput
{
```

```
<if(LEXER)>
  id\<IntStream\> input = anInput;<\n>
<endif>
<if(PARSER)>
  id\<TokenStream\> input = (id\<TokenStream\>)anInput;<\n>
<endif>
<if(TREE_PARSER)>
  id\<TreeNodeStream\> input = (id\<TreeNodeStream\>)anInput;<\n>
<endif>
  switch (s) {
    <dfa.specialStateSTs:{state |
    case <i0> : ;<! compressed special state numbers 0..n-1 !>
        <state>}; separator="\n">
  }
<if(backtracking)>
  if ( [recognizer getBacktrackingLevel] > 0 ) { [recognizer setFailed:YES]; return -1; }<\n>
<endif>
  NoViableAltException *nvae = [NoViableAltException newException:<dfa.decisionNumber> state:s
stream:recognizer.input];
  // nvae.c = s;
  /* [self error:nvae]; */ <! for debugger - do later !>
  @throw nvae;
}<\n>
/* end dfa.specialStateSTs */
<endif>

- (void) dealloc
{
  //free(transition);
  [super dealloc];
}

- (NSString *) description
{
  return @"<dfa.description>";
}

<@errorMethod()>

@end /* end DFA<dfa.decisionNumber> implementation */<\n>
#pragma mark Cyclic DFA implementation end DFA<dfa.decisionNumber>
<\n>
>>
/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber, stateNumber, edges, needErrorClause, semPredState) ::= <<
/* cyclicDFAState */
```

```
NSInteger LA<decisionNumber>_<stateNumber> = [input LA:1];<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
NSInteger index<decisionNumber>_<stateNumber> = input.index;
[input rewind];<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
[input seek:index<decisionNumber>_<stateNumber>];<\n>
<endif>
if ( s >= 0 )
    return s;
break;
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
/* cyclicDFAEdge */
if (<labelExpr><if(predicates)> && (<predicates>)<endif>) { s = <targetStateNumber>;}<\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n> /* eotDFAEdge */
>>

// D F A   E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"


orPredicates(operands) ::= "(<operands; separator=\"||\">)"


notPredicate(pred) ::= "!(<evalPredicate(pred, {})>)"


evalPredicate(pred,description) ::= "(<pred>)"


/*
 * evalSynPredicate(pred,description) ::= "<pred>()"
 *
 * synpreds are broken in cyclic DFA special states
 * Damn! For now, work around with using the selectors directly, and by providing a trampoline evalSynPred method in
 * DFA
 */
```

/* evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:<pred>Selector stream:input]" */
evalSynPredicate(pred,description) ::= "[self evaluateSyntacticPredicate:@selector(<pred>_fragment)]"
/* evalSynPredicate(pred,description) ::= "[recognizer <pred>]" */

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "[input LA:<k>] == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lower> && LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(([input LA:<k>] >=
<lower>) && ([input LA:<k>] \<= <upper>))"

setTest(ranges) ::= <%
<ranges; separator="||">
%>

// A T T R I B U T E S

memVars(scope) ::= <% <scope.attributes:{a|<a.type> <a.name>;<\n>}; separator="\n"> %>

properties(scope) ::= <%
<scope.attributes:{a|@property (assign, getter=get<a.name>, setter=set<a.name>:) <a.type> <a.name>;<\n>};
separator="\n">
%>

methodsDecl(scope) ::= <%
<scope.attributes:{a|- (<a.type>)get<a.name>;<\n>- (void)set<a.name>:(<a.type>)aVal;<\n>}; separator="\n">
%>

synthesize(scope) ::= <% <scope.attributes:{a|@synthesize <a.name>;}; separator="\n"> %>

methods(scope) ::= <%
<scope.attributes:{a|
- (<a.type>)get<a.name> { return(<a.name>); \}<\n>
- (void)set<a.name>:(<a.type>)aVal { <a.name> = aVal; \}<\n>}; separator="\n">
%>

globalAttributeScopeInterface(scope) ::= <%
/* globalAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
<if(scope.attributes)>
<memVars(scope)>

```
<endif>
}<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface properties */<\n>
<properties(scope)>
/* end globalAttributeScopeInterface properties */<\n>
<endif>

+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<if(scope.attributes)>
/* start of globalAttributeScopeInterface methodsDecl */<\n>
<methodsDecl(scope)>
/* End of globalAttributeScopeInterface methodsDecl */<\n>
<endif>
@end /* end of <scope.name>_Scope interface */<\n>
%>

globalAttributeScopeMemVar(scope) ::= <%
/* globalAttributeScopeMemVar */<\n>
SymbolStack *<scope.name>_stack;<\n>
<scope.name>_Scope *<scope.name>_scope;<\n>
%>

globalAttributeScopeImplementation(scope) ::= <%
@implementation <scope.name>_Scope  /* globalAttributeScopeImplementation */<\n>
<if(scope.attributes)>
/* start of synthesize -- OBJC-Line 1750 */<\n>
<synthesize(scope)><\n>
<endif>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
  return [[<scope.name>_Scope alloc] init];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions */<\n>
<endif>
@end /* end of <scope.name>_Scope implementation */<\n><\n>
```

```
%>

globalAttributeScopeInit(scope) ::= <<
/* globalAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
<scope.name>_stack = [SymbolStack newSymbolStackWithLen:30];<\n>
>>

globalAttributeScopeDealloc(scope) ::= <% [<scope.name>_stack release];<\n> %>

globalAttributeScope(scope) ::= <%
<if(scope.name)>
static <scope.name>_stack;<\n>
<endif>
%>

ruleAttributeScopeMemVar(scope) ::= <%
/* ObjC ruleAttributeScopeMemVar */<\n>
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope; /* ObjC ruleAttributeScopeMemVar */<\n>
<endif>
%>

ruleAttributeScopeInterface(scope) ::= <%
<if(scope.attributes)>
/* start of ruleAttributeScopeInterface */<\n>
@interface <scope.name>_Scope : SymbolsScope {<\n>
  <memVars(scope)><\n>
}<\n>
<\n>
/* start property declarations */<\n>
<properties(scope)><\n>
/* start method declarations */<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope;<\n>
- (id) init;<\n>
<methodsDecl(scope)><\n>
@end /* end of ruleAttributeScopeInterface */<\n><\n>
<endif>
%>

ruleAttributeScopeImplementation(scope) ::= <%
<if(scope.attributes)>
@implementation <scope.name>_Scope  /* start of ruleAttributeScopeImplementation */<\n>
<synthesize(scope)><\n>
<\n>
+ (<scope.name>_Scope *)new<scope.name>_Scope<\n>
{<\n>
  return [[<scope.name>_Scope alloc] init];<\n>
```

```
}<\n>
<\n>
- (id) init<\n>
{<\n>
  self = [super init];<\n>
  return self;<\n>
}<\n>
<\n>
/* start of <scope.name>_Scope get and set functions */<\n>
<methods(scope)><\n>
/* End of <scope.name>_Scope get and set functions */<\n>
@end /* end of ruleAttributeScopeImplementation */<\n><\n>
<endif>
%>


ruleAttributeScopeInit(scope) ::= <%
/* ruleAttributeScopeInit */<\n>
<scope.name>_scope = [<scope.name>_Scope new<scope.name>_Scope];<\n>
<scope.name>_stack = [SymbolStack newSymbolStackWithLen:30];<\n>
%>


ruleAttributeScopeDealloc(scope) ::= <% [<scope.name>_Scope release];<\n> %>


ruleAttributeScope(scope) ::= <%
<if(scope.attributes)>
/* ruleAttributeScope */<\n>
static SymbolStack *<scope.name>_stack;<\n>
static <scope.name>_Scope *<scope.name>_scope;
<endif>
%>


ruleAttributeScopeDecl(scope) ::= <%
/* ruleAttributeScopeDecl */<\n>
<if(scope.attributes)>
<scope.name>_Scope *<scope.name>_scope;<\n>
<endif>
%>


returnStructName(r) ::= "<className()>_<r.name>_return"


returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()> *
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
```

```
void
<endif>
<endif>
<else>
void
<endif>
%>


/** Generate the Objective-C type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<className()>_<referencedRule.name>_return *<else>
<if(referencedRule.hasSingleReturnValue)><referencedRule.singleValueReturnType><else>
void<endif>
<endif>
%>


delegateName(d) ::= <% <if(d.label)><d.label><else>g<d.name><endif> %>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <% <objcTypeInitMap.(typeName)> %>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
%>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScopeInterface(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
/* returnScopeInterface <ruleDescriptor:returnStructName()> */
@interface <ruleDescriptor:returnStructName()> :
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope { /* returnScopeInterface line 1838 */
<@memVars()> /* ObjC start of memVars() */<\n>
<if(scope.attributes)>
<memVars(scope)><\n>
<endif>
}
/* start property declarations */
<@properties()><\n>
```

```
<if(scope.attributes)>
<properties(scope)><\n>
<endif>
/* start of method declarations */<\n>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()>;
/* this is start of set and get methods */
<@methodsDecl()> /* methodsDecl */<\n>
<if(scope.attributes)>
/* start of iterated get and set functions */<\n>
<methodsDecl(scope)><\n>
<endif>
@end /* end of returnScopeInterface interface */<\n>
<endif>
>>


returnScopeImplementation(scope) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
@implementation <ruleDescriptor:returnStructName()> /* returnScopeImplementation */<\n>
<@synthesize()> /* start of synthesize -- OBJC-Line 1837 */<\n>
<if(scope.attributes)>
   <synthesize(scope)><\n>
<endif>
+ (<ruleDescriptor:returnStructName()> *)new<ruleDescriptor:returnStructName()><\n>
{<\n>
   return [[[<ruleDescriptor:returnStructName()> alloc] init] retain];<\n>
}<\n>
<\n>
- (id) init<\n>
{<\n>
   self = [super init];<\n>
   return self;<\n>
}<\n>
<\n>
<@methods()><\n>
<if(scope.attributes)>
/* start of iterate get and set functions */<\n>
<methods(scope)><\n>
/* End of iterate get and set functions */<\n>
<endif>
<actions.(actionScope).ruleReturnMethods>
<@ruleReturnMembers()><\n>
@end /* end of returnScope implementation */<\n><\n>
<endif>
%>


parameterScope(scope) ::= <<
<! <scope.attributes:{it | :(<it.type>)<it.name>}; separator=" "> !>
<first(scope.attributes):{ a | :(<a.type>)<a.name>}> <rest(scope.attributes):{ a | arg<i>:(<a.type>)<a.name> };
```

separator=" ">
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>;"

/** Note that the scopeAttributeRef does not have access to the
 * grammar name directly
 */
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
([((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack size]-<negIndex>-1)]).<attr.name>
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name>
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
/* scopeSetAttributeRef */
<if(negIndex)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:([<scope>_stack size]-<negIndex>-1)]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
<endif>
%>

scopeAttributeRefStack() ::= <<
/* scopeAttributeRefStack */
<if(negIndex)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:[<scope>_stack count]-<negIndex>-1]).<attr.name> = <expr>;
<else>
<if(index)>
((<scope>_Scope *)[<scope>_stack objectAtIndex:<index>]).<attr.name> = <expr>;
<else>
((<scope>_Scope *)[<scope>_stack peek]).<attr.name> = <expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers

```
*  to stack itself not top of stack.  This is useful for predicates
*  like {$function.size()>0 && $function::name.equals("foo")}?
*/
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=nil?<scope>.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>  /* added to returnAttributeRef */<\n>
<else>
<attr.name><\n>
<endif>
%>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> =<expr>; /* added to returnSetAttributeRef */<\n>
<else>
<attr.name> = <expr>;<\n>
<endif>
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


/* not sure the next are the right approach; and they are evaluated early; */
/* they cannot see TREE_PARSER or PARSER attributes for example. :( */

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=nil?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=nil?[<scope>.text integerValue]:0)"
```

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.start):nil)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=nil?((<labelType> *)<scope>.stopToken):nil)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=nil?((<ASTLabelType> *)<scope>.tree):nil)"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=nil?[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor] getTokenStartIndex:[<scope>
getStart]]
      ToEnd:[[input getTreeAdaptor] getTokenStopIndex:[<scope> getStart]]]:0)
<else>
(<scope>!=nil?([input toStringFromToken:[<scope> getStart] ToToken:[<scope> getStop]]:0)
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=nil?[<scope> st]:nil)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>!=nil?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>!=nil?<scope>.line:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=nil?<scope>.charPositionInLine:-1)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=nil?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>!=nil?[<scope> getTokenIndex]:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>!=nil?<scope>.text:nil)"
lexerRuleLabelPropertyRef_int(scope,attr) ::="(<scope>!=nil?[<scope>.text integerValue]:0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType> *)retval.start)"
rulePropertyRef_stop(scope,attr) ::= "((<labelType> *)retval.stopToken)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType> *)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
[[input getTokenStream] toStringFromStart:[[input getTreeAdaptor]
getTokenStartIndex:retval.start.token.startIndex]
                      ToEnd:[[input getTreeAdaptor] getTokenStopIndex:retval.start.token.stopIndex]]
<else>
[input toStringFromToken:retval.start ToToken:[input LT:-1]]
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

/* hideous: find a way to cut down on the number of templates to support read/write access */
/* TODO: also, which ones are valid to write to? ask Ter */
lexerRuleSetPropertyRef_text(scope,attr,expr) ::= "state.text = <expr>;"
lexerRuleSetPropertyRef_type(scope,attr,expr) ::= "_type"
lexerRuleSetPropertyRef_line(scope,attr,expr) ::= "state.tokenStartLine"
lexerRuleSetPropertyRef_pos(scope,attr,expr) ::= "state.tokenStartCharPositionInLine"
lexerRuleSetPropertyRef_index(scope,attr,expr) ::= "-1" /* undefined token index in lexer */

lexerRuleSetPropertyRef_channel(scope,attr,expr) ::= "state.channel=<expr>;"
lexerRuleSetPropertyRef_start(scope,attr,expr) ::= "state.tokenStartCharIndex"
lexerRuleSetPropertyRef_stop(scope,attr,expr) ::= "(input.index-1)"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "state.type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(input.index-1)"
lexerRulePropertyRef_int(scope,attr) ::= "[<scope>.text integerValue]"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.start =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;" /* "<\n>#error StringTemplates are
unsupported<\n>" */

/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
if (<actions.(actionScope).synpredgate>) {
  <action>
}
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
static ANTLRBitSet *<name>;
static const unsigned long long <name>_data[] = { <words64:{it | <it>LL};separator=", ">};<\n>
>>

bitsetInit(name, words64) ::= <<
<name> = [[ANTLRBitSet newBitSetWithBits:(const unsigned long long *)<name>_data
Count:(NSUInteger)<length(words64)>] retain];<\n>
>>

codeFileExtension() ::= ".m"

true_value() ::= "YES"
false_value() ::= "NO"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ObjC/ObjC.stg
No license file was found, but licenses were detected in source scan.

```
/*
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

group Perl5;

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
      docComment, recognizer,
      name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
```

```
      backtracking, synpreds, memoize, numRules,
      fileName, ANTLRVersion, generatedTimestamp, trace,
      scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
<actions.(actionScope).header>

<@imports>
<if(TREE_PARSER)>
<endif>
<if(backtracking)>
<endif>
<@end>

<docComment>
<recognizer>
>>

lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="ANTLR::Runtime::Lexer")  ::= <<
package <name>;

use Carp;
use English qw( -no_match_vars ) ;
use Readonly;
use Switch;

use ANTLR::Runtime::BaseRecognizer;
use ANTLR::Runtime::DFA;
use ANTLR::Runtime::NoViableAltException;

use Moose;

extends 'ANTLR::Runtime::Lexer';

Readonly my $HIDDEN => ANTLR::Runtime::BaseRecognizer->HIDDEN;
sub HIDDEN { $HIDDEN }

use constant {
  <tokens:{ <it.name> => <it.type>, }; separator="\n">
};
<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<actions.lexer.members>

sub BUILD {
  my ($self, $arg_ref) = @_;

  $self->init_dfas();
```

```
}

sub get_grammar_file_name {
  return "<fileName>";
}

<if(filterMode)>
<filteringNextToken()>
<endif>
<rules; separator="\n\n">

<synpreds:{p | <lexerSynpred(p)>}>

<cyclicDFAs:{dfa | has 'dfa<dfa.decisionNumber>';}; separator="\n">

sub init_dfas {
  my ($self) = @_;

  <cyclicDFAs:{dfa |
  $self->dfa<dfa.decisionNumber>(<name>::DFA<dfa.decisionNumber>->new({ recognizer => $self }));
  }; separator="\n">

  return;
}

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;

>>

perlTypeInitMap ::= [
 "$":"undef",
 "@":"()",
 "%":"()",
 default:"undef"
]

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at backtracking==1.
 */
filteringNextToken() ::= <<
public Token nextToken() {
```

```
  while (true) {
     if ( input.LA(1)==CharStream.EOF ) {
        return Token.EOF_TOKEN;
     }
     token = null;
channel = Token.DEFAULT_CHANNEL;
     tokenStartCharIndex = input.index();
     tokenStartCharPositionInLine = input.getCharPositionInLine();
     tokenStartLine = input.getLine();
text = null;
     try {
        int m = input.mark();
        backtracking=1; <! means we won't throw slow exception !>
        failed=false;
        mTokens();
        backtracking=0;
        <! mTokens backtracks with synpred at backtracking==2
           and we set the synpredgate to allow actions at level 1. !>
        if ( failed ) {
           input.rewind(m);
           input.consume(); <! advance one char and try again !>
        }
        else {
           emit();
           return token;
        }
     }
     catch (RecognitionException re) {
        // shouldn't happen in backtracking mode, but...
        reportError(re);
        recover(re);
     }
  }
}

public void memoize(IntStream input,
  int ruleIndex,
  int ruleStartIndex)
{
if ( backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
if ( backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>
```

```
actionGate() ::= "$self->state->backtracking==0"

filteringActionGate() ::= "backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass, filterMode,
        ASTLabelType="Object", labelType, members) ::= <<
package <name>;

use English qw( -no_match_vars ) ;
use Readonly;
use Switch;
use Carp;
use ANTLR::Runtime::BitSet;

use Moose;

extends '<@superClassName><superClass><@end>';

Readonly my $token_names => [
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
];

use constant {
<tokens:{ <it.name> => <it.type>, }; separator="\n">
};

<bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
          words64=it.bits)>

<scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
<@members>
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>

sub BUILD {
  my ($self, $arg_ref) = @_;

<if(backtracking)>
  $self->state->rule_memo({});<\n>
<endif>
}
<@end>

sub get_token_names {
  return $token_names;
}
```

```
sub get_grammar_file_name {
  return "<fileName>";
}

<members>

<rules; separator="\n\n">

<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = __PACKAGE__::DFA<dfa.decisionNumber>->new($self);};
separator="\n">
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

no Moose;
__PACKAGE__->meta->make_immutable();
1;
__END__
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType,
superClass="ANTLR::Runtime::Parser", labelType="ANTLR::Runtime::Token",
members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ANTLR::Runtime::TokenStream", ...)>
>>

/** How to generate a tree parser; same as parser except the input
 * stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="Object", superClass="ANTLR::Runtime::TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
<genericParser(inputStreamType="TreeNodeStream", ...)>
>>

/** A simpler version of a rule template that is specific to the imaginary
 * rules created for syntactic predicates.  As they never have return values
 * nor parameters etc..., just give simplest possible method.  Don't do
 * any of the normal memoization stuff in here either; it's a waste.
 * As predicates cannot be inlined into the invoking rule, they need to
 * be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start <ruleName>
sub <ruleName>_fragment {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>
```

```
<if(trace)>
  $self->traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
  eval {
      <block>
  };
  $self->traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  if ($EVAL_ERROR) {
      croak $EVAL_ERROR;
  }
<else>
  <block>
<endif>
}
# $ANTLR end <ruleName>
>>


synpred(name) ::= <<
public final boolean <name>() {
  backtracking++;
  <@start()>
  int start = input.mark();
  try {
      <name>_fragment(); // can never throw exception
  } catch (RecognitionException re) {
      System.err.println("impossible: "+re);
  }
  boolean success = !failed;
  input.rewind(start);
  <@stop()>
  backtracking--;
  failed=false;
  return success;
}<\n>
>>


lexerSynpred(name) ::= <<
<synpred(name)>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if ( backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()>; }
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>
```

```
if ($self->state->failed) {
  return <ruleReturnValue()>;
}
<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (backtracking>0) {failed=true; return <ruleReturnValue()>;}<endif>
>>


/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start <ruleName>
# <fileName>:<description>
sub <ruleName>() {
  my ($self, <ruleDescriptor.parameterScope:parameterScope(scope=it)>) = @_;
  <if(trace)>$self->traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  eval {
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>
  };
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  my $exception = $EVAL_ERROR;
  if (ref $exception && $exception->isa('ANTLR::Runtime::RecognitionException')) {
    $self->report_error($exception);
    $self->recover($self->input, $exception);
    $exception = undef;
  }<\n>
<endif>
```

```
<endif>
<endif>
  <if(trace)>$self->traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  if ($exception) {
    croak $exception;
    #$exception->rethrow();
  }
  <@postamble()>
  return <ruleReturnValue()>;
}
# $ANTLR end <ruleName>
>>

catch(decl,action) ::= <<
catch (<e.decl>) {
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
my $retval = <returnType()>->new();
$retval->set_start($self->input->LT(1));<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
my $<a.name> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
my $<ruleDescriptor.name>_start_index = $self->input->index();
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.push(new <it>_scope());}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.push(new <it.name>_scope());}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>_stack.pop();}; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
```

```
:{my $<it.label.text> = undef;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{List list_<it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|RuleReturnScope <ll.label.text> = null;}; separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{<labelType> <it.label.text>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{my $<it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{List list_<it.label.text>=null;}; separator="\n"
>
>>


ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
$<ruleDescriptor.singleValueReturnName>
<else>
$retval
<endif>
<endif>
<endif>
>>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
$retval->set_stop($self->input->LT(-1));<\n>
<endif>
<endif>
>>


memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
```

```
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start <ruleName>
sub m_<ruleName> {
# <ruleDescriptor.parameterScope:parameterScope(scope=it)>
  my ($self) = @_;
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleDeclarations()>
  eval {
<if(nakedBlock)>
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    <block><\n>
<else>
    my $_type = <ruleName>;
    my $_channel = $self->DEFAULT_TOKEN_CHANNEL;
    <ruleMemoization(name=ruleName)>
    <lexerRuleLabelDefs()>
    <ruleDescriptor.actions.init>
    <block>
    <ruleCleanUp()>
    $self->state->type($_type);
    $self->state->channel($_channel);
    <(ruleDescriptor.actions.after):execAction()>
<endif>
  };
  <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
  <memoize()>

  if ($EVAL_ERROR) {
    croak $EVAL_ERROR;
  }
}
# $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
sub m_tokens {
  my ($self) = @_;
```

```
  <block><\n>
}
>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch ($alt<decisionNumber>) {
  <alts:altSwitchCase()>
}
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
my $alt<decisionNumber> = <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch ($alt<decisionNumber>) {
  <alts:altSwitchCase()>
}
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
```

```
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
my $cnt<decisionNumber> = 0;
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch ($alt<decisionNumber>) {
   <alts:altSwitchCase()>
   else {
      if ( $cnt<decisionNumber> >= 1 ) { last LOOP<decisionNumber> }
      <ruleBacktrackFailure()>
       my $eee =
          ANTLR::Runtime::EarlyExitException->new(<decisionNumber>, $self->input);
       <@earlyExitException()>
       croak $eee;
    }
  }
  ++$cnt<decisionNumber>;
}
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
LOOP<decisionNumber>:
while (1) {
  my $alt<decisionNumber> = <maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch ($alt<decisionNumber>) {
   <alts:altSwitchCase()>
```

```
    else { last LOOP<decisionNumber> }
  }
}
<@postloop()>
>>


closureBlockSingleAlt ::= closureBlock


/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase() ::= <<
case <i> {
  <@prealt()>
  <it>
}<\n>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
# <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>


/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""


// E L E M E N T S


/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el><\n>
```

```
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>$<label> =<endif>$self->match($self->input, <token>,
$FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new ArrayList();
list_<label>.add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
$self->match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
$self->match_range(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= $self->input->LA(1);<\n>
<else>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
<endif>
if ( <s> ) {
    $self->input->consume();
    <postmatchCode>
```

```
<if(!LEXER)>
  $self->state->error_recovery(0);
<endif>
  <if(backtracking)>failed=false;<endif>
}
else {
  <ruleBacktrackFailure()>
  my $mse =
    ANTLR::Runtime::MismatchedSetException->new(undef, $self->input);
  <@mismatchedSetException()>
<if(LEXER)>
  $self->recover($mse);
  $mse->throw();
<else>
  $mse->throw();
  <! use following code to make it recover inline; remove throw mse;
  $self->recoverFromMismatchedSet($self->input, $mse, $FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
}<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
int <label>Start = getCharIndex();
$self->match(<string>); <checkRuleBacktrackFailure()>
<labelType> <label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE,
Token.DEFAULT_CHANNEL, <label>Start, getCharIndex()-1);
<else>
$self->match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>

wildcard(label,elementIndex) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>
```

```
wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = $self->input->LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>

/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
$self->push_follow($FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
$<label> = $self-><rule.name>(<args; separator=", ">);<\n>
<else>
$self-><rule.name>(<args; separator=", ">);<\n>
<endif>
$self->state->_fsp($self->state->_fsp - 1);
<checkRuleBacktrackFailure()>
>>

/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>

/** A lexer rule reference.
 *
 * The 'rule' argument was the target rule name, but now
 * is type Rule, whose toString is same: the rule name.
 * Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
$self->m_<rule>(<args; separator=", ">); <checkRuleBacktrackFailure()>
```

```
<label> = new CommonToken(input, Token.INVALID_TOKEN_TYPE, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<else>
$self->m_<rule.name>(<args; separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
int <label>Start<elementIndex> = getCharIndex();
match(EOF); <checkRuleBacktrackFailure()>
<labelType> <label> = new CommonToken(input, EOF, Token.DEFAULT_CHANNEL,
<label>Start<elementIndex>, getCharIndex()-1);
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) ) {
```

```
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
else {
<if(eotPredictsAlt)>
  $alt<decisionNumber> = <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  my $nvae =
    ANTLR::Runtime::NoViableAltException->new({
      grammar_decision_description => "<description>",
      decision_number => <decisionNumber>,
      state_number => <stateNumber>,
      input => $self->input,
    });<\n>
  <@noViableAltException()>
  croak $nvae;<\n>
<endif>
}
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels">
>>


/** A DFA state that is actually the loopback decision of a closure
 *  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
 *  This is used only in the lexer so that for ('a')* on the end of a rule
 *  anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
my $LA<decisionNumber>_<stateNumber> = $self->input->LA(<k>);<\n>
<edges; separator="\nels"><\n>
<if(eotPredictsAlt)>
```

```
<if(!edges)>
$alt<decisionNumber> = <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
  $alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "$alt<decisionNumber> = <alt>;"


/** A simple edge with an expression.  If the expression is satisfied,
*  enter to the target state.  To handle gated productions, we may
*  have to evaluate some predicates for this edge.
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
  <targetState>
}
>>


// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
*  decides if this is possible: CodeGenerator.canGenerateSwitch().
*/
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
  <edges; separator="\n">
  else {
  <if(eotPredictsAlt)>
    $alt<decisionNumber> = <eotPredictsAlt>;
  <else>
    <ruleBacktrackFailure()>
    my $nvae =
      ANTLR::Runtime::NoViableAltException->new({
        grammar_decision_description => "<description>",
        decision_number => <decisionNumber>,
        state_number => <stateNumber>,
        input => $self->input,
      });<\n>
    <@noViableAltException()>
    croak $nvae;<\n>
  <endif>
  }
}<\n>
```

```
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
  <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( $self->input->LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else { $alt<decisionNumber> = <eotPredictsAlt> }<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
case [<labels:{ <it> }; separator=", ">] { <targetState> }
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
$alt<decisionNumber> = $self->dfa<decisionNumber>->predict($self->input);
>>

/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
 */
cyclicDFA(dfa) ::= <<
Readonly my $DFA<dfa.decisionNumber>_eot => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOT; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_eof => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedEOF; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_min => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedMin; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_max => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedMax; separator=", "> ]);
```

```perl
Readonly my $DFA<dfa.decisionNumber>_accept => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedAccept; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_special => ANTLR::Runtime::DFA->unpack_rle([
<dfa.javaCompressedSpecial; separator=", "> ]);
Readonly my $DFA<dfa.decisionNumber>_transition => [
<dfa.javaCompressedTransition:{s|ANTLR::Runtime::DFA->unpack_rle([ <s; separator=", "> ])}; separator=", "> ];


{
package <name>::DFA<dfa.decisionNumber>;
use ANTLR::Runtime::Class;

use strict;
use warnings;

extends 'ANTLR::Runtime::DFA';

sub BUILD {
  my $self = shift;
  my $param_ref = __PACKAGE__->unpack_params(@_, {
    spec => [
      {
        name => 'recognizer',
        isa  => 'ANTLR::Runtime::BaseRecognizer'
      },
    ]
  });

  $self->recognizer($param_ref->{recognizer});
  $self->decision_number(<dfa.decisionNumber>);
  $self->eot($DFA<dfa.decisionNumber>_eot);
  $self->eof($DFA<dfa.decisionNumber>_eof);
  $self->min($DFA<dfa.decisionNumber>_min);
  $self->max($DFA<dfa.decisionNumber>_max);
  $self->accept($DFA<dfa.decisionNumber>_accept);
  $self->special($DFA<dfa.decisionNumber>_special);
  $self->transition($DFA<dfa.decisionNumber>_transition);
}

sub get_description {
  return "<dfa.description>";
}

<@errorMethod()>

<if(dfa.specialStateSTs)>
sub special_state_transition {
  my ($self, $param_ref) = unpack_params(@_, {
    spec => [
```

```
          {
            name => 's',
            type => SCALAR,
          },
          {
            name => 'input',
            isa  => 'ANTLR::Runtime::IntStream',
          }
        ]
      });
    my $s = $param_ref->{s};
    my $input = $param_ref->{input};

    switch ($s) {
      <dfa.specialStateSTs:{state |
      case <i0> \{ <! compressed special state numbers 0..n-1 !>
        <state>}; separator="\n">
      }
    }

<if(backtracking)>
  if ($self->state->backtracking > 0) {
    $self->state->failed = 1;
    return -1;
  }<\n>
<endif>

    my $nvae =
      ANTLR::Runtime::NoViableAltException->new({
        grammar_decision_description => $self->get_description(),
        decision_number => <dfa.decisionNumber>,
        state_number => $s,
        input => $input,
      });<\n>
    $self->error($nvae);
    $nvae->throw();
  }<\n>
<endif>
}<\n>
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
my $input = $self->input;
my $LA<decisionNumber>_<stateNumber> = $input->LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
```

```
my $index<decisionNumber>_<stateNumber> = $input->index();
$input->rewind();<\n>
<endif>
s = -1;
<edges; separator="\nels">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>
```

```
/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>
```

```
/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>
```

// D F A   E X P R E S S I O N S

```
andPredicates(left,right) ::= "(<left> && <right>)"
```

```
orPredicates(operands) ::= "(<operands; separator=\"||\">)"
```

```
notPredicate(pred) ::= "!(<evalPredicate(...)>)"
```

```
evalPredicate(pred,description) ::= "<pred>"
```

```
evalSynPredicate(pred,description) ::= "<pred>()"
```

```
lookaheadTest(atom,k,atomAsInt) ::= "$LA<decisionNumber>_<stateNumber> eq <atom>"
```

```
/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "$self->input->LA(<k>) eq <atom>"
```

```
lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
($LA<decisionNumber>_<stateNumber> ge <lower> && $LA<decisionNumber>_<stateNumber> le <upper>)
```

```
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "($self->input->LA(<k>) ge
<lower> && $self->input->LA(<k>) le <upper>)"

setTest(ranges) ::= "<ranges; separator=\" || \">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
  <scope.attributes:{<it.decl>;}; separator="\n">
}
protected Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>


ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected static class <scope.name>_scope {
  <scope.attributes:{<it.decl>;}; separator="\n">
}
protected Stack <scope.name>_stack = new Stack();<\n>
<endif>
>>


returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.name>_return
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
```

```
<else>
void
<endif>
<endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "undef".
 */
initValue(typeName) ::= <<
<if(typeName)>
<perlTypeInitMap.(typeName)>
<else>
undef
<endif>
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
my $<label.label.text> = <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{
  package <returnType()>;
  use ANTLR::Runtime::Class;

  extends 'ANTLR::Runtime::<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope';

  <scope.attributes:{public <it.decl>;}; separator="\n">
  <@ruleReturnMembers()>
}
<endif>
>>


parameterScope(scope) ::= <<
<scope.attributes:{$<it.name>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "$<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "$<attr.name> =<expr>;"


scopeAttributeRef(scope,attr,index,negIndex) ::= <<
```

```
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name>
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name>
<else>
((<scope>_scope)<scope>_stack.peek()).<attr.name>
<endif>
<endif>
>>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
((<scope>_scope)<scope>_stack.elementAt(<scope>_stack.size()-<negIndex>-1)).<attr.name> =<expr>;
<else>
<if(index)>
((<scope>_scope)<scope>_stack.elementAt(<index>)).<attr.name> =<expr>;
<else>
((<scope>_scope)<scope>_stack.peek()).<attr.name> =<expr>;
<endif>
<endif>
>>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
$<scope>.<attr.name>
<else>
$<scope>
<endif>
>>


returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
$<attr.name>
<endif>
>>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
```

```
retval.<attr.name> =<expr>;
<else>
$<attr.name> =<expr>;
<endif>
>>


/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "$<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "$<scope>->get_text()"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "((<labelType>)<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "((<labelType>)<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
 input.getTreeAdaptor().getTokenStopIndex(<scope>.start))
<else>
substr($self->input, $<scope>->start, $<scope>->stop)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "$<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "<scope>.getType()"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "<scope>.getLine()"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "<scope>.getCharPositionInLine()"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "<scope>.getChannel()"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "<scope>.getTokenIndex()"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "<scope>.getText()"
```

```
// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "((<labelType>)retval.start)"
rulePropertyRef_stop(scope,attr) ::= "((<labelType>)retval.stop)"
rulePropertyRef_tree(scope,attr) ::= "((<ASTLabelType>)retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.getTokenStream().toString(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start))
<else>
input.toString(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "getText()"
lexerRulePropertyRef_type(scope,attr) ::= "$_type"
lexerRulePropertyRef_line(scope,attr) ::= "tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "$_channel"
lexerRulePropertyRef_start(scope,attr) ::= "tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(getCharIndex()-1)"
lexerRulePropertyRef_self(scope,attr) ::= "$self"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"


/** How to execute an action */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
if ( backtracking==0 ) {
 <action>
}
<endif>
<else>
<action>
<endif>
>>
```

// M I S C (properties, etc...)

```
bitset(name, words64) ::= <<
Readonly my $<name> => ANTLR::Runtime::BitSet->new({ words64 => [ <words64:{'<it>'};separator=", "> ]
});<\n>
>>


codeFileExtension() ::= ".pm"


true() ::= "1"
false() ::= "0"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Perl5/Perl5.stg
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** Templates for building ASTs during tree parsing.
 *
 *  Deal with many combinations.  Dimensions are:
```

```
*  Auto build or rewrite
*    no label, label, list label  (label/no-label handled together)
*    child, root
*    token, set, rule, wildcard
*
*  Each combination has its own template except that label/no label
*  is combined into tokenRef, ruleRef, ...
*/


/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = null;
<ASTLabelType> _last = null;<\n>
<endif>
>>


/** What to emit when there is no rewrite rule.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = _first_0;
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
 retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>


/** match ^(root children) in tree parser; override here to
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
  enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<endif>
<root:element()>
<if(rewriteMode)>
```

```
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> =
(<ASTLabelType>)<root.el.label>.getTree();
<elseif(root.el.label)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
 match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
 <children:element()>
 match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
<else>
<super.tree(...)>
<endif>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>


/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
```

```
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>
```

```
/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>


/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
```

```
<else>
<super.matchSet(...)>
<endif>
>>


matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>


matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>


matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = (<ASTLabelType>)<label>.getTree();
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabel(label, {<label>.getTree()})>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.getTree()})>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>

/** rule when output=AST and tracking for rewrite */
```

```
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRootTrack(...)>
<endif>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>


/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>


ruleCleanUp() ::= <<
<super.ruleCleanUp()>
```

```
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
asTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "Number":"0.0",
 "Boolean":"false",
 default:"null" // anything other than an atomic type
```

```
]

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
      docComment, recognizer,
      name, tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>
package<if(actions.(actionScope).package)> <actions.(actionScope).package><endif> {
  <actions.(actionScope).header>
  <@imports>
import org.antlr.runtime.*;
<if(TREE_PARSER)>
  import org.antlr.runtime.tree.*;
<endif>
  <@end>

  <docComment>
  <recognizer>
}
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="Token",
    superClass="Lexer") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
><@end><endif> {
  <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">
  <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
  <actions.lexer.members>

  // delegates
  <grammar.delegates:
     {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  // delegators
  <grammar.delegators:
     {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

  public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:CharStream = null, state:RecognizerSharedState = null) {
     super(input, state);
```

```
      <cyclicDFAs:cyclicDFACtor()>
<if(memoize)>
<if(grammar.grammarIsRoot)>
      this.state.ruleMemo = new Array(<numRules>+1);<\n> <! index from 1..n !>
<endif>
<endif>
      <grammar.directDelegates:
       {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>this,
input, this.state);}; separator="\n">
      <grammar.delegators:
       {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
      <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
   }
   public override function get grammarFileName():String { return "<fileName>"; }


<if(filterMode)>
   <filteringNextToken()>
<endif>
   <rules; separator="\n\n">


   <synpreds:{p | <lexerSynpred(p)>}>


   <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>


}
>>


/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at backtracking==1.
 */
filteringNextToken() ::= <<
public override function nextToken():Token {
  while (true) {
    if ( input.LA(1)==CharStreamConstants.EOF ) {
       return TokenConstants.EOF_TOKEN;
    }
    this.state.token = null;
   this.state.channel = TokenConstants.DEFAULT_CHANNEL;
    this.state.tokenStartCharIndex = input.index;
    this.state.tokenStartCharPositionInLine = input.charPositionInLine;
    this.state.tokenStartLine = input.line;
   this.state.text = null;
    try {
       var m:int = input.mark();
       this.state.backtracking=1; <! means we won't throw slow exception !>
```

```
            this.state.failed=false;
            mTokens();
            this.state.backtracking=0;
            <! mTokens backtracks with synpred at backtracking==2
              and we set the synpredgate to allow actions at level 1. !>
            if ( this.state.failed ) {
                input.rewindTo(m);
                input.consume(); <! advance one char and try again !>
            }
            else {
                emit();
                return this.state.token;
            }
        }
        catch (re:RecognitionException) {
            // shouldn't happen in backtracking mode, but...
            reportError(re);
            recover(re);
        }
    }
    // Not reached - For ActionScript compiler
    throw new Error();
}

public override function memoize(input:IntStream,
 ruleIndex:int,
 ruleStartIndex:int):void
{
if ( this.state.backtracking>1 ) super.memoize(input, ruleIndex, ruleStartIndex);
}

public override function alreadyParsedRule(input:IntStream, ruleIndex:int):Boolean {
if ( this.state.backtracking>1 ) return super.alreadyParsedRule(input, ruleIndex);
return false;
}
>>

actionGate() ::= "this.state.backtracking==0"

filteringActionGate() ::= "this.state.backtracking==1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="Object") ::= <<
public class <grammar.recognizerName> extends
<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else><@superClassName><superClass
```

```
><@end><endif> {
<if(grammar.grammarIsRoot)>
  public static const tokenNames:Array = [
     "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
  ];<\n>
<endif>
  <tokens:{it |public static const <it.name>:int=<it.type>;}; separator="\n">

  // delegates
  <grammar.delegates: {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  // delegators
  <grammar.delegators:
     {g|public var <g:delegateName()>:<g.recognizerName>;}; separator="\n">
  <last(grammar.delegators):{g|public var gParent:<g.recognizerName>;}>

  <scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>
  <@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
  public function <grammar.recognizerName>(<grammar.delegators:{g|<g:delegateName()>:<g.recognizerName>,
}>input:<inputStreamType>, state:RecognizerSharedState = null) {
     super(input, state);
     <cyclicDFAs:cyclicDFACtor()>
     <parserCtorBody()>
     <grammar.directDelegates:
     {g|<g:delegateName()> = new <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>this,
input, this.state);}; separator="\n">
     <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
     <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
  }
  <@end>

  public override function get tokenNames():Array { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; }
  public override function get grammarFileName():String { return "<fileName>"; }

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
     appear to be defined in this recognizer. !>
     // Delegated rules
  <grammar.delegatedRules:{ruleDescriptor|
     public function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
<if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope.attribut
es:{a|<a.name>}; separator=", ">); \}}; separator="\n">
```

```
  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | <bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
              words64=it.bits)>}>
}
>>


parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new Array(<length(grammar.allImportedRules)>+1);<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>


parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType="Object",
superClass="Parser", labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TokenStream", superClass,
        labelType, members, "Token",
        false, ASTLabelType)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
        superClass="TreeParser", members={<actions.treeparser.members>}) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TreeNodeStream", superClass,
        labelType, members, "Node",
        filterMode, ASTLabelType)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
```

```
<<
// $ANTLR start <ruleName>
public final function <ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>):void {
  <ruleLabelDefs()>
<if(trace)>
  traceIn("<ruleName>_fragment", <ruleDescriptor.index>);
  try {
    <block>
  }
  finally {
    traceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  }
<else>
  <block>
<endif>
}
// $ANTLR end <ruleName>
>>

synpred(name) ::= <<
public final function <name>():Boolean {
  this.state.backtracking++;
  <@start()>
  var start:int = input.mark();
  try {
    <name>_fragment(); // can never throw exception
  } catch (re:RecognitionException) {
    trace("impossible: "+re);
  }
  var success:Boolean = !this.state.failed;
  input.rewindTo(start);
  <@stop()>
  this.state.backtracking--;
  this.state.failed=false;
  return success;
}<\n>
>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if ( this.state.backtracking>0 && alreadyParsedRule(input, <ruleDescriptor.index>) ) { return <ruleReturnValue()>;
}
<endif>
>>
```

```
/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.failed) return <ruleReturnValue()>;<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (this.state.backtracking>0) {this.state.failed=true; return <ruleReturnValue()>;}<endif>
>>


/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
// $ANTLR start <ruleName>
// <fileName>:<description>
public final function <ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):<returnType()> {
  <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
  <@preamble()>
  try {
    <ruleMemoization(name=ruleName)>
    <block>
    <ruleCleanUp()>
    <(ruleDescriptor.actions.after):execAction()>
  }
<if(exceptions)>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
  <actions.(actionScope).rulecatch>
<else>
  catch (re:RecognitionException) {
    reportError(re);
    recoverStream(input,re);
    <@setErrorReturnValue()>
  }<\n>
<endif>
<endif>
<endif>
  finally {
    <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
```

```
            <memoize()>
            <ruleScopeCleanUp()>
            <finally>
        }
    <@postamble()>
    return <ruleReturnValue()>;
}
// $ANTLR end <ruleName>
>>


catch(decl,action) ::= <<
catch (<e.decl>) {
    <e.action>
}
>>


ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
var retval:<returnType()> = new <returnType()>();
retval.start = input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
var <a.name>:<a.type> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
var <ruleDescriptor.name>_StartIndex:int = input.index;
<endif>
>>


ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.push(new Object());}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.push(new Object());}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it |<it>_stack.pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it |<it.name>_stack.pop();}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
    :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
    :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
```

```
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|var <ll.label.text>:RuleReturnScope = null;}; separator="\n">
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
   :{it |var <it.label.text>:<labelType>=null;}; separator="\n"
>
<ruleDescriptor.charLabels:{it |var <it.label.text>:int;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
   :{it |var list_<it.label.text>:Array=null;}; separator="\n"
>
>>

ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = input.LT(-1);<\n>
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this.state.backtracking>0 ) { memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 * fragment rules.
 */
```

```
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start <ruleName>
public final function m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>):void {
    <if(trace)>traceIn("<ruleName>", <ruleDescriptor.index>);<endif>
    <ruleScopeSetUp()>
    <ruleDeclarations()>
    try {
<if(nakedBlock)>
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block><\n>
<else>
        var _type:int = <ruleName>;
        var _channel:int = DEFAULT_TOKEN_CHANNEL;
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block>
        <ruleCleanUp()>
        this.state.type = _type;
        this.state.channel = _channel;
        <(ruleDescriptor.actions.after):execAction()>
<endif>
    }
    finally {
        <if(trace)>traceOut("<ruleName>", <ruleDescriptor.index>);<endif>
        <ruleScopeCleanUp()>
        <memoize()>
    }
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
public override function mTokens():void {
    <block><\n>
}
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
```

```
var alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
var alt<decisionNumber>:int=<maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>) {
  <alts:{a | <altSwitchCase(i, a)>}>
}
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
var cnt<decisionNumber>:int=0;
<decls>
```

```
<@preloop()>
loop<decisionNumber>:
do {
  var alt<decisionNumber>:int=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
<alts:{a | <altSwitchCase(i, a)>}>
default :
    if ( cnt<decisionNumber> >= 1 ) break loop<decisionNumber>;
    <ruleBacktrackFailure()>
        throw new EarlyExitException(<decisionNumber>, input);
        <! Need to add support for earlyExitException debug hook !>
  }
  cnt<decisionNumber>++;
} while (true);
<@postloop()>
>>

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
loop<decisionNumber>:
do {
  var alt<decisionNumber>:int=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>) {
<alts:{a | <altSwitchCase(i, a)>}>
default :
    break loop<decisionNumber>;
  }
} while (true);
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
```

optionalBlock ::= block

optionalBlockSingleAlt ::= block

```
/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum, alt) ::= <<
case <altNum> :
  <@prealt()>
  <alt>
  break;<\n>
>>
```

```
/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>
```

```
/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""
```

// E L E M E N T S

```
/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>
```

```
/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label>=<labelType>(<endif>matchStream(input,<token>,FOLLOW_<token>_in_<ruleName><element
Index>)<if(label)>)<endif>; <checkRuleBacktrackFailure()>
>>
```

```
/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
```

```
<listLabel(label, label)>
>>

listLabel(label,elem) ::= <<
if (list_<label>==null) list_<label>=new Array();
list_<label>.push(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= input.LA(1);<\n>
<else>
<label>=<labelType>(input.LT(1));<\n>
<endif>
<endif>
if ( <s> ) {
  input.consume();
  <postmatchCode>
<if(!LEXER)>
  this.state.errorRecovery=false;
<endif>
  <if(backtracking)>this.state.failed=false;<endif>
}
else {
  <ruleBacktrackFailure()>
  <@mismatchedSetException()>
<if(LEXER)>
  throw recover(new MismatchedSetException(null,input));<\n>
<else>
  throw new MismatchedSetException(null,input);
```

```
  <! use following code to make it recover inline; remove throw mse;
  recoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
  !>
<endif>
}<\n>
>>


matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
var <label>Start:int = charIndex;
matchString(<string>); <checkRuleBacktrackFailure()>
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
matchString(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=<labelType>(input.LT(1));<\n>
<endif>
matchAny(input); <checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(label, label)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
matchAny(); <checkRuleBacktrackFailure()>
```

```
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 *
 * GMS: Note:  do not use post-decrement operator!  ASC produces bad code for exceptions in this case.
 *      See: https://bugs.adobe.com/jira/browse/ASC-3625
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
pushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
state._fsp = state._fsp - 1;
<checkRuleBacktrackFailure()>
>>



/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference.
 *
 * The 'rule' argument was the target rule name, but now
 * is type Rule, whose toString is same: the rule name.
 * Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
var <label>Start<elementIndex>:int = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> = CommonToken.createFromStream(input, TokenConstants.INVALID_TOKEN_TYPE,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
```

```
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
var <label>Start<elementIndex>:int = charIndex;
var <label>StartLine<elementIndex>:int = line;
var <label>StartCharPos<elementIndex>:int = charPositionInLine;
match(EOF); <checkRuleBacktrackFailure()>
var <label>:<labelType> = CommonToken.createFromStream(input, EOF,
TokenConstants.DEFAULT_CHANNEL, <label>Start<elementIndex>, charIndex-1);
<label>.line = <label>StartLine<elementIndex>;
<label>.charPositionInLine = <label>StartCharPos<elementIndex>;
<else>
match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>

// used for left-recursive rules
recRuleDefArg()                    ::= "var <recRuleArg()>:int"
recRuleArg()                ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)      ::= "$<name>=$<src>.<name>;"

/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
  matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
```

```
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(pred,description)>) ) {
  <ruleBacktrackFailure()>
  throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse ">
else {
<if(eotPredictsAlt)>
  alt<decisionNumber>=<eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
  <! Need to add hook for noViableAltException() !>
<endif>
}
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>


/** A DFA state that is actually the loopback decision of a closure
 *  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
 *  This is used only in the lexer so that for ('a')* on the end of a rule
 *  anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(<k>);<\n>
```

```
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else {
   alt<decisionNumber>=<eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"


/** A simple edge with an expression.  If the expression is satisfied,
 *  enter to the target state.  To handle gated productions, we may
 *  have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {
   <targetState>
}
>>


// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 *  decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   throw new NoViableAltException("<description>", <decisionNumber>, <stateNumber>, input);<\n>
   <! Need to add hook for noViableAltException !>
<endif>
}<\n>
>>


dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
   <edges; separator="\n">
}<\n>
```

```
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( input.LA(<k>) ) {
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber>=<eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
  {
  <targetState>
  }
  break;
>>

// C y c l i c  D F A

/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = dfa<decisionNumber>.predict(input);
>>

cyclicDFACtor(dfa) ::= <<

dfa<dfa.decisionNumber> = new DFA(this, <dfa.decisionNumber>,
      "<dfa.description>",
      DFA<dfa.decisionNumber>_eot, DFA<dfa.decisionNumber>_eof, DFA<dfa.decisionNumber>_min,
      DFA<dfa.decisionNumber>_max, DFA<dfa.decisionNumber>_accept, DFA<dfa.decisionNumber>_special,
      DFA<dfa.decisionNumber>_transition<if(dfa.specialStateSTs)>,
DFA<dfa.decisionNumber>_specialStateTransition<endif>);

>>
/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
```

```
*/
cyclicDFA(dfa) ::= <<

private const DFA<dfa.decisionNumber>_eot:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedEOT; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_eof:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedEOF; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_min:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedMin; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_max:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedMax; wrap="\"+\n    \"">", true);
private const DFA<dfa.decisionNumber>_accept:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedAccept; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_special:Array =
    DFA.unpackEncodedString("<dfa.javaCompressedSpecial; wrap="\"+\n    \"">");
private const DFA<dfa.decisionNumber>_transition:Array = [
    <dfa.javaCompressedTransition:{s|DFA.unpackEncodedString("<s; wrap="\"+\n\"">")}; separator=",\n">
];
<if(dfa.specialStateSTs)>
  private function DFA<dfa.decisionNumber>_specialStateTransition(dfa:DFA, s:int, _input:IntStream):int {
      <if(LEXER)>
      var input:IntStream = _input;
      <endif>
      <if(PARSER)>
      var input:TokenStream = TokenStream(_input);
      <endif>
      <if(TREE_PARSER)>
      var input:TreeNodeStream = TreeNodeStream(_input);
      <endif>
   var _s:int = s;
      switch ( s ) {
      <dfa.specialStateSTs:{state |
      case <i0> : <! compressed special state numbers 0..n-1 !>
          <state>}; separator="\n">
      }
<if(backtracking)>
      if (this.state.backtracking>0) {this.state.failed=true; return -1;}<\n>
<endif>
      throw dfa.error(new NoViableAltException(dfa.description, <dfa.decisionNumber>, _s, input));
  }<\n>
<endif>

protected var dfa<dfa.decisionNumber>:DFA;  // initialized in constructor

>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
```

```
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
var LA<decisionNumber>_<stateNumber>:int = input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
var index<decisionNumber>_<stateNumber>:int = input.index;
input.rewind();<\n>
<endif>
s = -1;
<edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
if ( s>=0 ) return s;
break;
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>



// D F A   E X P R E S S I O N S

andPredicates(left,right) ::= "(<left>&&<right>)"

orPredicates(operands) ::= "(<operands; separator=\"||\">)"

notPredicate(pred) ::= "!(<evalPredicate(pred,{})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber>==<atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
```

isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atomAsInt>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<stateNumber> >= <lowerAsInt> && LA<decisionNumber>_<stateNumber> \<=
<upperAsInt>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(input.LA(<k>) >=
<lowerAsInt> && input.LA(<k>) \<= <upperAsInt>)"

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected var <scope.name>_stack:Array = new Array();<\n>
<endif>
>>

ruleAttributeScope(scope) ::= <<
<if(scope.attributes)>
protected var <scope.name>_stack:Array = new Array();<\n>
<endif>
>>

returnStructName() ::= "<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
>>

/** Generate the Java type associated with a single or multiple return
 * values.
 */
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<returnStructName()>

```
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>


delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<asTypeInitMap.(typeName)>
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
var <label.label.text>:<ruleLabelType(referencedRule=label.referencedRule)> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public static class <returnType()> extends <if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope {
    <scope.attributes:{it |public <it.decl>;}; separator="\n">
    <@ruleReturnMembers()>
};
<endif>
>>


parameterScope(scope) ::= <<
<scope.attributes:{it |<it.name>:<it.type>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> =<expr>;"


scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
```

```
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name>
<else>
<if(index)>
<scope>_stack[<index>].<attr.name>
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name>
<endif>
<endif>
>>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
<scope>_stack[<scope>_stack.length-<negIndex>-1].<attr.name> =<expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name> =<expr>;
<else>
<scope>_stack[<scope>_stack.length-1].<attr.name> =<expr>;
<endif>
<endif>
>>

/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?<scope>.values.<attr.name>:<initValue(attr.type)>)
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.values.<attr.name> =<expr>;
```

```
<else>
<attr.name> =<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.text:null)"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.charPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.tokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int(<scope>.text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.start):null)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?<labelType>(<scope>.stop):null)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>!=null?<ASTLabelType>(<scope>.tree):null)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(<scope>!=null?(input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(<scope>.start),
 input.treeAdaptor.getTokenStopIndex(<scope>.start))):null)
<else>
(<scope>!=null?input.toStringWithTokenRange(<scope>.start,<scope>.stop):null)
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.st:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
  "(<scope>!=null?<scope>.type:0)"
lexerRuleLabelPropertyRef_line(scope,attr) ::=
  "(<scope>!=null?<scope>.lien:0)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::=
  "(<scope>!=null?<scope>.charPositionInLine:0)"
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
```

```
    "(<scope>!=null?<scope>.channel:0)"
lexerRuleLabelPropertyRef_index(scope,attr) ::=
  "(<scope>!=null?<scope>.tokenIndex:0)"
lexerRuleLabelPropertyRef_text(scope,attr) ::=
  "(<scope>!=null?<scope>.text:null)"
lexerRuleLabelPropertyRef_int(scope,attr) ::=
  "(<scope>!=null?int(<scope>.text):0)"


// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "<labelType>(retval.start)"
rulePropertyRef_stop(scope,attr) ::= "<labelType>(retval.stop)"
rulePropertyRef_tree(scope,attr) ::= "<ASTLabelType>(retval.tree)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
input.tokenStream.toStringWithRange(
 input.treeAdaptor.getTokenStartIndex(retval.start),
 input.treeAdaptor.getTokenStopIndex(retval.start))
<else>
input.toStringWithTokenRange(retval.start,input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"


lexerRulePropertyRef_text(scope,attr) ::= "text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(charIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"


// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>;"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <action>
}
<else>
<action>
<endif>
>>
```

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
public static const <name>:BitSet = new BitSet([<words64:{it |<it>};separator=", ">]);<\n>
>>

codeFileExtension() ::= ".as"

true_value() ::= "true"
false_value() ::= "false"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ActionScript/ActionScript.stg
No license file was found, but licenses were detected in source scan.

/*
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

```
/** The API version of the runtime that recognizers generated by this runtime
 *  need.
 */
apiVersion() ::= "1"


// System.Boolean.ToString() returns "True" and "False", but the proper C# literals are "true" and "false"
// The Java version of Boolean returns "true" and "false", so they map to themselves here.
booleanLiteral ::= [
        "True":"true",
        "False":"false",
        "true":"true",
        "false":"false",
        default:"false"
]


/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
        bitsets, buildTemplate, buildAST, rewriteMode, profile,
        backtracking, synpreds, memoize, numRules,
        fileName, ANTLRVersion, generatedTimestamp, trace,
        scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
from antlr3.tree import *<\n>
<endif>
from antlr3.compat import set, frozenset
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
<tokens:{it | <it.name>=<it.type>}; separator="\n">

<recognizer>
```

```
<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
    from antlr3.main import LexerMain
    main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
    from antlr3.main import ParserMain
    main = ParserMain("<recognizer.grammar.name>Lexer", <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
    from antlr3.main import WalkerMain
    main = WalkerMain(<recognizer.name>)<\n>
<endif>
    main.stdin = stdin
    main.stdout = stdout
    main.stderr = stderr
    main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
    main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
    labelType="CommonToken", superClass="Lexer") ::= <<
<grammar.directDelegates:
{g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
    <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

    grammarFileName = "<fileName>"
    api_version = <apiVersion()>

    def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input=None, state=None):
        if state is None:
            state = RecognizerSharedState()
        super(<grammar.recognizerName>, self).__init__(input, state)

<if(memoize)>
<if(grammar.grammarIsRoot)>
```

```
    self._state.ruleMemo = {}
<endif>
<endif>


    <grammar.directDelegates:
     {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
    <grammar.directDelegates:
     {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
    <grammar.delegators:
     {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
    <last(grammar.delegators):
   {g|self.gParent = <g:delegateName()>}; separator="\n">
    self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

    <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

    <actions.lexer.init>


  <actions.lexer.members>


<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>


>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at backtracking==1.
 */
filteringNextToken() ::= <<
def nextToken(self):
  while True:
    if self.input.LA(1) == EOF:
      return self.makeEOFToken()
```

```python
        self._state.token = None
        self._state.channel = DEFAULT_CHANNEL
        self._state.tokenStartCharIndex = self.input.index()
        self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
        self._state.tokenStartLine = self.input.line
        self._state._text = None
        try:
            m = self.input.mark()
            try:
                # means we won't throw slow exception
                self._state.backtracking = 1
                try:
                    self.mTokens()
                finally:
                    self._state.backtracking = 0

            except BacktrackingFailed:
                # mTokens backtracks with synpred at backtracking==2
                # and we set the synpredgate to allow actions at level 1.
                self.input.rewind(m)
                self.input.consume() # advance one char and try again

            else:
                self.emit()
                return self._state.token

        except RecognitionException, re:
            # shouldn't happen in backtracking mode, but...
            self.reportError(re)
            self.recover(re)


def memoize(self, input, ruleIndex, ruleStartIndex, success):
    if self._state.backtracking > 1:
        # is Lexer always superclass?
        super(<grammar.recognizerName>, self).memoize(input, ruleIndex, ruleStartIndex, success)


def alreadyParsedRule(self, input, ruleIndex):
    if self._state.backtracking > 1:
        return super(<grammar.recognizerName>, self).alreadyParsedRule(input, ruleIndex)
    return False


>>

actionGate() ::= "self._state.backtracking == 0"
```

filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass, labelType, members,
      rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
<if(grammar.grammarIsRoot)>
# token names
tokenNames = [
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
  <tokenNames; wrap, separator=", ">
]\<\n>
<else>
from <grammar.composite.rootGrammar.recognizerName> import tokenNames\<\n>
<endif>
<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>

<grammar.directDelegates:
{g|from <g.recognizerName> import <g.recognizerName>}; separator="\n">

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
  grammarFileName = "<fileName>"
  api_version = <apiVersion()>
  tokenNames = tokenNames

  def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
    if state is None:
        state = RecognizerSharedState()

    <@args()>
    super(<grammar.recognizerName>, self).__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
    self._state.ruleMemo = {}
<endif>
<endif>

    <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

    <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
 <rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

```
  <grammar.delegators:
   {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
  <grammar.directDelegates:
   {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
  <grammar.directDelegates:
   {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
  <last(grammar.delegators):
 {g|self.gParent = self.<g:delegateName()>}; separator="\n">
  self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

 <@init><@end>


  <@members><@end>

  <members>

  <rules; separator="\n\n">

  <! generate rule/method definitions for imported rules so they
    appear to be defined in this recognizer. !>
  <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

  <synpreds:{p | <synpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

  <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex> = frozenset([<it.tokenTypes:{it |
<it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >  <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)


>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>},
    init={<actions.parser.init>}
    ) ::= <<
```

```
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TokenStream", superClass,
        labelType, members, "Token",
        false, init, ASTLabelType)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
   init={<actions.treeparser.init>}
        ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TreeNodeStream", superClass,
        labelType, members, "Node",
        filterMode, init, ASTLabelType)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
  <ruleLabelDefs()>
<if(trace)>
  self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
  try:
      <block>

  finally:
      self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
  <block>
<endif>
# $ANTLR end "<ruleName>"


>>
```

```
synpred(name) ::= <<
def <name>(self):
  self._state.backtracking += 1
  <@start()>
  start = self.input.mark()
  try:
      self.<name>_fragment()
  except BacktrackingFailed:
      success = False
  else:
      success = True
  self.input.rewind(start)
  <@stop()>
  self._state.backtracking -= 1
  return success


>>


lexerSynpred(name) ::= <<
<synpred(name)>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking > 0 and self.alreadyParsedRule(self.input, <ruleDescriptor.index>):
  # for cached failed rules, alreadyParsedRule will raise an exception
  success = True
  return <ruleReturnValue()>

<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
  raise BacktrackingFailed

<endif>
>>


/** How to generate code for a rule.  This includes any return type
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>
```

```
# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
    self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
    <ruleScopeSetUp()>
    <ruleDeclarations()>
    <ruleLabelDefs()>
    <ruleDescriptor.actions.init>
    <@preamble()>
    <@body><ruleBody()><@end>
    <@postamble()>
    return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
    try:
        <ruleMemoization(name=ruleName)>
        <block>
        <ruleCleanUp()>
        <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
        success = True<\n>
<endif>
<endif>
<if(exceptions)>
    <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
    <actions.(actionScope).rulecatch>
<else>
    except RecognitionException, re:
        self.reportError(re)
        self.recover(self.input, re)
```

```
    <@setErrorReturnValue()>

<endif>
<else>
  finally:
    pass

<endif>
<endif>
finally:
<if(trace)>
  self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  pass
>>

catch(decl,action) ::= <<
except <e.decl>:
  <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>

ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>
```

```
ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
 ruleDescriptor.wildcardTreeListLabels]
  :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
  :{it | list_<it.label.text> = None}; separator="\n"
>
>>


ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = self.input.LT(-1)<\n>
<endif>
<endif>
>>


memoize() ::= <<
```

```
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
    self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
    self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
    <ruleScopeSetUp()>
    <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
    success = False<\n>
<endif>
<endif>
    try:
<if(nakedBlock)>
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block><\n>
<else>
        _type = <ruleName>
        _channel = DEFAULT_CHANNEL

        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block>
        <ruleCleanUp()>
        self._state.type = _type
        self._state.channel = _channel
        <(ruleDescriptor.actions.after):execAction()>
<endif>
<if(memoize)>
<if(backtracking)>
        success = True<\n>
<endif>
```

```
<endif>

  finally:
<if(trace)>
    self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
 <ruleScopeCleanUp()>
    <memoize()>
    pass

# $ANTLR end "<ruleName>"


>>


/** How to generate code for the implicitly-defined lexer grammar rule
*  that chooses between lexer rules.
*/
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
  <block><\n>


>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody() ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
```

```
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
<@postloop()>
>>

positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
  alt<decisionNumber> = <maxAlt>
  <@predecision()>
  <@decisionBody><decision><@end>
  <@postdecision()>
  <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
  else:
    if cnt<decisionNumber> >= 1:
      break #loop<decisionNumber>
```

```
        <ruleBacktrackFailure()>
        eee = EarlyExitException(<decisionNumber>, self.input)
        <@earlyExitException()>
        raise eee

    cnt<decisionNumber> += 1
>>


positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
<@loopBody>
<closureBlockLoop()>
<@end>
<@postloop()>
>>


closureBlockLoop() ::= <<
while True: #loop<decisionNumber>
    alt<decisionNumber> = <maxAlt>
    <@predecision()>
    <@decisionBody><decision><@end>
    <@postdecision()>
    <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
    else:
        break #loop<decisionNumber>
>>


closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
```

```
  <@prealt()>
  <alt>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt, treeLevel,rew) ::= <<
# <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>


/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>


/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>


/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>


listLabel(label, elem) ::= <<
if list_<label> is None:
   list_<label> = []
list_<label>.append(<elem>)<\n>
>>


/** match a character */
charRef(char,label) ::= <<
<if(label)>
```

```
<label> = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
if <s>:
    self.input.consume()
    <postmatchCode>
<if(!LEXER)>
    self._state.errorRecovery = False<\n>
<endif>

else:
    <ruleBacktrackFailure()>
    mse = MismatchedSetException(None, self.input)
    <@mismatchedSetException()>
<if(LEXER)>
    self.recover(mse)
    raise mse
<else>
    raise mse
    <! use following code to make it recover inline; remove throw mse;
    self.recoverFromMismatchedSet(
        self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
        )
    !>
<endif>
<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
```

```
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(<string>)
<endif>
>>

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny(self.input)
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>

/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchAny()
>>

wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>

/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values. The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
```

```
*/
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>

/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>

/** A lexer rule reference
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
  input=self.input,
  type=INVALID_TOKEN_TYPE,
  channel=DEFAULT_CHANNEL,
  start=<label>Start<elementIndex>,
  stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
```

```
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.setLine(<label>StartLine<elementIndex>)
<label>.setCharPositionInLine(<label>StartCharPos<elementIndex>)
<else>
self.match(EOF)
<endif>
>>


// used for left-recursive rules
recRuleDefArg()               ::= "<recRuleArg()>"
recRuleArg()                  ::= "_p"
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()      ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)   ::= "$<name> = $<src>.<name>"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
  self.match(self.input, DOWN, None)
  <children:element()>
  self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
  <ruleBacktrackFailure()>
  raise FailedPredicateException(self.input, "<ruleName>", "<description>")


>>


// F i x e d  D F A  (if-then-else)
```

```
dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
    alt<decisionNumber> = <eotPredictsAlt>
<else>
    <ruleBacktrackFailure()>
    nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
    <@noViableAltException()>
    raise nvae<\n>
<endif>
>>
```

```
/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>
```

```
/** A DFA state that is actually the loopback decision of a closure
 *  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
 *  This is used only in the lexer so that for ('a')* on the end of a rule
 *  anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
    alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>
```

```
/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"
```

```
/** A simple edge with an expression.  If the expression is satisfied,
 *  enter to the target state.  To handle gated productions, we may
 *  have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
  <targetState>
>>


// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 *  decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python. ATM this is implemented as a list of if .. elif ..
 This may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
  alt<decisionNumber> = <eotPredictsAlt>
<else>
  <ruleBacktrackFailure()>
  nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
  <@noViableAltException()>
  raise nvae<\n>
<endif>

>>


dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>


dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>
else:
  alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>
```

```
dfaEdgeSwitch(labels, targetState) ::= <<
if <labels:{it | LA<decisionNumber> == <it>}; separator=" or ">:
  <targetState>
>>


// C y c l i c  D F A


/** The code to initiate execution of a cyclic DFA; this is used
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>


/* Dump DFA tables as run-length-encoded Strings of octal values.
* Can't use hex as compiler translates them before compilation.
* These strings are split into multiple, concatenated strings.
* Java puts them back together at compile time thankfully.
* Java cannot handle large static arrays, so we're stuck with this
* encode/decode approach.  See analysis and runtime DFA for
* the encoding methods.
*/
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>


DFA<dfa.decisionNumber>_eot = DFA.unpack(
  u"<dfa.javaCompressedEOT; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_eof = DFA.unpack(
  u"<dfa.javaCompressedEOF; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_min = DFA.unpack(
  u"<dfa.javaCompressedMin; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_max = DFA.unpack(
  u"<dfa.javaCompressedMax; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_accept = DFA.unpack(
  u"<dfa.javaCompressedAccept; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_special = DFA.unpack(
```

```
  u"<dfa.javaCompressedSpecial; wrap="\"\n    u\"">"
  )


DFA<dfa.decisionNumber>_transition = [
  <dfa.javaCompressedTransition:{s|DFA.unpack(u"<s; wrap="\"\nu\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
  pass

  <@errorMethod()>

<if(dfa.specialStateSTs)>
  def specialStateTransition(self_, s, input):
      # convince pylint that my self_ magic is ok ;)
      # pylint: disable-msg=E0213

      # pretend we are a member of the recognizer
      # thus semantic predicates can be evaluated
      self = self_.recognizer

      _s = s

      <dfa.specialStateSTs:{state | if s == <i0>: <! compressed special state numbers 0..n-1 !>
  <state>}; separator="\nel">

<if(backtracking)>
      if self._state.backtracking > 0:
          raise BacktrackingFailed

<endif>
      nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
      self_.error(nvae)
      raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
  self, <dfa.decisionNumber>,
  eot = self.DFA<dfa.decisionNumber>_eot,
  eof = self.DFA<dfa.decisionNumber>_eof,
  min = self.DFA<dfa.decisionNumber>_min,
  max = self.DFA<dfa.decisionNumber>_max,
```

```
    accept = self.DFA<dfa.decisionNumber>_accept,
    special = self.DFA<dfa.decisionNumber>_special,
    transition = self.DFA<dfa.decisionNumber>_transition
    )<\n>
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
    return s
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
    s = <targetStateNumber><\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
    s = <targetStateNumber><\n>
>>



// D F A   E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"
```

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
self.input.LA(<k>) \<= <upper>)"

setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
    <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
    <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

```
<endif>
<endif>
>>

ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>

returnStructName(r) ::= "<r.name>_return"

/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
    def __init__(self):
        super(<grammar.recognizerName>.<ruleDescriptor:returnStructName()>, self).__init__()

        <if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
        <@ruleReturnInit()>


    <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
```

parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
<endif>
%>

/* not applying patch because of bug in action parser!

<if(negIndex)>
((len(self.<scope>_stack) - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
 * to stack itself not top of stack. This is useful for predicates
 * like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"

```
/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
<else>
<scope>
<endif>
%>


returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>


/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"


/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach; and they are evaluated early;
// they cannot see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
```

```
  ((<scope> is not None) and [self.input.getTokenStream().toString(
    self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
    self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
  )] or [None])[0]
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)] or [None])[0]
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or
[0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"


/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
```

```
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
    pass
    <action>

<else>
if <actions.(actionScope).synpredgate>:
    pass
    <action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>


/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"


// M I S C (properties, etc...)

codeFileExtension() ::= ".py"


true_value() ::= "True"
false_value() ::= "False"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python/Python.stg
No license file was found, but licenses were detected in source scan.

```
/*
[The "BSD license"]
Copyright (c) 2005-2012 Terence Parr
All rights reserved.

Redistribution and use in source and binary forms, with or without
modification, are permitted provided that the following conditions
are met:
1. Redistributions of source code must retain the above copyright
   notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright
   notice, this list of conditions and the following disclaimer in the
   documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products
```

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 *  hierarchy is set up as ASTDbg : AST : Dbg : Python by code generator.
 */
group ASTDbg;

astAccessor() ::= <<
def setTreeAdaptor(self, adaptor):
<if(grammar.grammarIsRoot)>
    self._adaptor = DebugTreeAdaptor(self.dbg, adaptor)
<else>
    self._adaptor = adaptor # delegator sends dbg adaptor
<endif>
    <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(self._adaptor)}>

def getTreeAdaptor(self):
    return self._adaptor

adaptor = property(getTreeAdaptor, setTreeAdaptor)<\n>
>>

createListenerAndHandshake() ::= <<
proxy = DebugEventSocketProxy(self,
adaptor=<if(TREE_PARSER)>self.input.getTreeAdaptor()<else>self._adaptor<endif>,
                    debug=debug_socket, port=port)
self.setDebugListener(proxy)
self.adaptor.setDebugListener(proxy)
self.input.setDebugListener(proxy)
#self.set<inputStreamType>(Debug<inputStreamType>(self.input, proxy))
proxy.handshake()
>>

@rewriteElement.pregen() ::= "self._dbg.location(<e.line>, <e.pos>)"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python3/ASTDbg.stg
No license file was found, but licenses were detected in source scan.

group Delphi;

csharpTypeInitMap ::= [
 "int":"0",
 "uint":"0",
 "long":"0",
 "ulong":"0",
 "float":"0.0",
 "double":"0.0",
 "bool":"False",
 "byte":"0",
 "sbyte":"0",
 "short":"0",
 "ushort":"0",
 "char":"#0",

```
 "string":"""",
 "String":"""",
 default:"nil" // anything other than an atomic type
]

/** The overall file structure of a recognizer; stores methods for rules
 * and cyclic DFAs plus support code.
 * LEXER (Boolean): should we generate lexer code?
 * PARSER (Boolean): should we generate parser code?
 * TREE_PARSER (Boolean): should we generate tree parser code?
 * actionScope (String): 'lexer', 'parser', 'tree_parser' or custom scope
 * actions (HashMap):
 * docComment (String): document comment
 * recognizer (Object): recognizer class generator
 * name (String): name of grammar
 * tokens (HashMap<name: String, type: Integer>):
 * tokenNames:
 * rules:
 * cyclicDFAs:
 * bitsets:
 * buildTemplate (Boolean): should we generate a string template?
 * buildAST (Boolean): should we generate an AST?
 * rewriteMode (Boolean): are we rewriteing nodes?
 * profile (Boolean):
 * backtracking (Boolean): backtracking mode?
 * synpreds (): syntactic predicates
 * memoize (Boolean): should we memoize?
 * numRules (Integer): number of rules
 * fileName (String): fully qualified name of original .g file
 * ANTLRVersion (String): ANTLR version in Major.Minor.Build format
 * generatedTimestamp (String): date/time when the file is generated
 * trace (Boolean): should we trace input/output?
 * scopes:
 * superClass (String): name of base class, or empty string
 * literals:
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
    bitsets, buildTemplate, buildAST, rewriteMode, profile,
    backtracking, synpreds, memoize, numRules,
    fileName, ANTLRVersion, generatedTimestamp, trace,
    scopes, superClass, literals) ::=
<<
unit <name>;

{$HINTS OFF}
```

```
// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<actions.(actionScope).header>

interface

<@imports>
uses<\n>
<@end>
 <actions.(actionScope).usesInterface>
<if(TREE_PARSER)>
 Antlr.Runtime.Tree,<\n>
<endif>
 Antlr.Runtime,
 Antlr.Runtime.Collections,
 Antlr.Runtime.Tools;

<docComment>
<recognizer>
>>

/** Generates source code for the lexer class
* grammar (Grammar object)
*/
lexer(grammar, name, tokens, scopes, rules, numRules, labelType="Token",
    filterMode, superClass="Lexer") ::= <<
type
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
 end;

 T<grammar.recognizerName> = class(T<@superClassName><superClass><@end>,
I<grammar.recognizerName>)
 strict private
   FCnt: array [0..<grammar.numberOfDecisions>] of Byte;
   FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
   FException: ERecognitionException;
   procedure InitializeCyclicDFAs;
 <cyclicDFAs:cyclicDFADeclaration()>
 public
   const
     <tokens:{<it.name> = <it.type>;}; separator="\n">
   <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 strict private
   <actions.(actionScope).memberDeclarations>
 public
   // delegates
   <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
 public
```

```
  // delegators
  <grammar.delegators: {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
  <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>
 protected
   { IBaseRecognizer }
   function GetGrammarFileName: String; override;
<if(filterMode)>
   function AlreadyParsedRule(const Input: IIntStream;
     const RuleIndex: Integer): Boolean; override;
   procedure Memoize(const Input: IIntStream; const RuleIndex,
     RuleStartIndex: Integer); override;
 protected
   { ILexer }
   function NextToken: IToken; override;<\n>
<endif>
 protected
   { ILexer }
   procedure DoTokens; override;
 public
   constructor Create; overload;
   constructor Create(const AInput: ICharStream<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
   constructor Create(const AInput: ICharStream; const AState: IRecognizerSharedState<grammar.delegators:{g|;
const A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>); overload;

   <rules: {r | <if(!r.ruleDescriptor.isSynPred)><lexerRuleDeclaration(r)><endif>}>
   <synpreds:{p | <lexerSynpredDeclaration(p)>}; separator="\n">
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create;
begin
 InitializeCyclicDFAs;
end;

constructor T<grammar.recognizerName>.Create(const AInput: ICharStream<grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
```

```
begin
 Create(AInput, nil<grammar.delegators:{g|, A<g:delegateName()>}>);
end;


constructor T<grammar.recognizerName>.Create(const AInput: ICharStream; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
 inherited Create(AInput, AState);
 InitializeCyclicDFAs; { TODO: Necessary in Delphi??? Not removed yet. }
 <if(memoize)>
 <if(grammar.grammarIsRoot)>
 State.RuleMemoCount := <numRules>+1;<\n> <! index from 1..n !>
 <endif>
 <endif>
 <grammar.directDelegates:
  {g|<g:delegateName()> := T<g.recognizerName>.Create(AInput, State<trunc(g.delegators):{p|,
<p:delegateName()>}>, Self);}; separator="\n">
 <grammar.delegators:
  {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>
function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;


<if(filterMode)>
<filteringNextToken()>
<endif>


<rules; separator="\n\n">
<synpreds:{p | <lexerSynpred(p)>}>


procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
 <cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> :=
TDFA<dfa.decisionNumber>.Create(Self<@debugAddition()>);}; separator="\n">
 <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
end;


<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
end.>>


lexerRuleDeclaration(rule) ::= <<
```

```
procedure m<rule.ruleName>(<rule.ruleDescriptor.parameterScope:parameterScope(scope=rule)>);<\n>
>>


/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 * for matches.  No error can be generated upon error; just rewind, consume
 * a token and then try again.  backtracking needs to be set as well.
 *
 * Make rule memoization happen only at levels above 1 as we start mTokens
 * at backtracking==1.
 */
filteringNextToken() ::= <<
function T<grammar.recognizerName>.NextToken: IToken;
var
 M: Integer;
begin
 while (True) do
 begin
  if (Input.LA(1) = Integer(cscEOF)) then
    Exit(TToken.EOF_TOKEN);

  State.Token := nil;
  State.Channel := TToken.DEFAULT_CHANNEL;
  State.TokenStartCharIndex := Input.Index;
  State.TokenStartCharPositionInLine := Input.CharPositionInLine;
  State.TokenStartLine := Input.Line;
  State.Text := '';
  try
   M := Input.Mark();
   State.Backtracking := 1; <! means we won't throw slow exception !>
   State.Failed := False;
   mTokens();
   State.Backtracking := 0;
<!
   mTokens backtracks with synpred at backtracking==2
       and we set the synpredgate to allow actions at level 1.
!>
   if (State.Failed) then
   begin
    Input.Rewind(M);
    Input.Consume; <! // advance one char and try again !>
   end
   else
   begin
    Emit;
    Exit(State.Token);
   end;
  except
   on RE: ERecognitionException do
```

```
    begin
      // shouldn't happen in backtracking mode, but...
      ReportError(RE);
      Recover(RE);
    end;
  end;
 end;
end;


function T<grammar.recognizerName>.AlreadyParsedRule(const Input: IIntStream;
 const RuleIndex: Integer): Boolean;
begin
 if (State.Backtracking > 1) then
   Result := inherited AlreadyParsedRule(Input, RuleIndex)
 else
   Result := False;
end;


procedure T<grammar.recognizerName>.Memoize(const Input: IIntStream; const RuleIndex,
 RuleStartIndex: Integer);
begin
 if (State.Backtracking > 1) then
   inherited Memoize(Input, RuleIndex, RuleStartIndex);
end;


>>


filteringActionGate() ::= "(State.Backtracking = 1)"


/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass, filterMode,
        ASTLabelType="ANTLRInterface", labelType, members, rewriteElementType) ::= <<
type
 <rules: {r | <genericParserRuleReturnType(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 I<grammar.recognizerName> = interface(I<@superClassName><superClass><@end>)
   <rules: {r | <genericParserRuleInterface(rule=r, ruleDescriptor=r.ruleDescriptor)>}>
 end;


 T<grammar.recognizerName> = class(T<@superClassName><superClass><@end>,
I<grammar.recognizerName>)
<if(grammar.grammarIsRoot)>
 public
  const
   TOKEN_NAMES: array [0..<length(tokenNames)>+3] of String = (
     '\<invalid>',
     '\<EOR>',
     '\<DOWN>',
```

```
    '\<UP>',
    <tokenNames; separator=",\n">);<\n>
<endif>
public
  const
    <tokens:{<it.name> = <it.type>;}; separator="\n">
public
  // delegates
  <grammar.delegates: {g|<g:delegateName()>: I<superClass>; {<g.recognizerName>}}; separator="\n">
public
  // delegators
  <grammar.delegators: {g|<g:delegateName()>: Pointer; {<g.recognizerName>}}; separator="\n">
  <last(grammar.delegators):{g|gParent: Pointer; {<g.recognizerName>}}>

  <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScopeDeclaration(scope=it)><endif>}>
<@members>
  <! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
public
  constructor Create(const AInput: <inputStreamType><grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
  constructor Create(const AInput: <inputStreamType>; const AState:
IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>); overload;
<@end>
protected
  { IBaseRecognizer }
  function GetTokenNames: TStringArray; override;
  function GetGrammarFileName: String; override;
strict private
  <actions.(actionScope).memberDeclarations>
<rules: {r | <genericParserRuleDeclaration(rule=r, ruleDescriptor=r.ruleDescriptor)>}>

<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
  // Delegated rules
  <grammar.delegatedRules:{ruleDescriptor| <delegatedRuleDeclaration(ruleDescriptor)>}>

  <synpreds:{p | <synpredDeclaration(p)>}; separator="\n">
<cyclicDFAs:cyclicDFADeclaration()>
strict private
  FException: ERecognitionException;
  FLA: array [0..<grammar.numberOfDecisions>, 0..255] of Integer;
  FCnt: array [0..<grammar.numberOfDecisions>] of Byte;
  procedure InitializeCyclicDFAs;
<if(bitsets)>
public
  class var
    <bitsets:bitsetDecl(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>})>
```

```
 public
   class procedure InitializeBitsets; static;<\n>
<endif>
 end;

implementation

uses
 <grammar.delegates: {g|<g.recognizerName>,}; separator="\n">
 <grammar.delegators: {g|<g.recognizerName>,}; separator="\n">
 <actions.(actionScope).usesImplementation>
 SysUtils,
 StrUtils,
 Math;

{ T<grammar.recognizerName> }

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType><grammar.delegators:{g|; const
A<g:delegateName()>: IBaseRecognizer{<g.recognizerName>}}>);
begin
 Create(AInput, TRecognizerSharedState.Create<grammar.delegators:{g|, A<g:delegateName()>}>);
end;

constructor T<grammar.recognizerName>.Create(const AInput: <inputStreamType>;
 const AState: IRecognizerSharedState<grammar.delegators:{g|; const A<g:delegateName()>:
IBaseRecognizer{<g.recognizerName>}}>);
begin
 inherited Create(AInput, AState);
 <@membersConstructor>
 <@end>
 <parserCtorBody()>
 <grammar.directDelegates:{g|<g:delegateName()> := T<g.recognizerName>.Create(Input,
State<trunc(g.delegators):{p|, <p:delegateName()>}>, Self);}; separator="\n">
 <grammar.indirectDelegates:{g | <g:delegateName()> := <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
 <last(grammar.delegators):{g|gParent := Pointer(A<g:delegateName()>);}>
 <rules: {r | <ruleAttributeScopeInit(scope=r.ruleDescriptor.ruleScope)>}>
 <scopes:{<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.(actionScope).memberInitializations>
end;
<actions.(actionScope).memberImplementations>

<grammar.delegatedRules:{ruleDescriptor| <delegatedRuleImplementation(ruleDescriptor)>}; separator="\n">
procedure T<grammar.recognizerName>.InitializeCyclicDFAs;
begin
<cyclicDFAs:{dfa | FDFA<dfa.decisionNumber> := TDFA<dfa.decisionNumber>.Create(Self);}; separator="\n">
 <cyclicDFAs:{dfa | <if(dfa.specialStateSTs)>FDFA<dfa.decisionNumber>.SpecialStateTransitionHandler :=
DFA<dfa.decisionNumber>_SpecialStateTransition;<endif>}; separator="\n">
```

```
end;

<if(bitsets)>
class procedure T<grammar.recognizerName>.InitializeBitsets;
begin
 <bitsets:bitset(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>
end;
<endif>

<@membersImplementation>
<@end>

function T<grammar.recognizerName>.GetTokenNames: TStringArray;
var
 I: Integer;
begin
 SetLength(Result,Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES));
 for I := 0 to Length(T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES) - 1 do
  Result[I] := T<grammar.composite.rootGrammar.recognizerName>.TOKEN_NAMES[I];
end;

function T<grammar.recognizerName>.GetGrammarFileName: String;
begin
 Result := '<fileName>';
end;

<rules; separator="\n\n">
<synpreds:{p | <synpred(p)>}>

<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
<if(bitsets)>
initialization
 T<grammar.recognizerName>.InitializeBitsets;<\n>
<endif>
end.>>

delegatedRuleDeclaration(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;<\n>
<else>
procedure <ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);<\n>
<endif>
<endif>
```

```
>>

delegatedRuleImplementation(ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
): <returnType()>;<\n>
<else>
procedure
T<grammar.recognizerName>.<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>
);<\n>
<endif>
<endif>
begin
 <if(ruleDescriptor.hasReturnValue)>Result :=<endif>
T<ruleDescriptor.grammar.recognizerName>(<ruleDescriptor.grammar:delegateName()>.Implementor).<ruleDescri
ptor.name>(<ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
end;

>>

parserCtorBody() ::= <<
InitializeCyclicDFAs;
<if(memoize)>
<if(grammar.grammarIsRoot)>
State.RuleMemoCount := <length(grammar.allImportedRules)>+1;<\n> <! index from 1..n !>
<endif>
<endif>
<grammar.delegators: {g|<g:delegateName()> := Pointer(A<g:delegateName()>);}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets, ASTLabelType, superClass="Parser",
labelType="Token", members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="Token", ...)>
>>

/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules, numRules, bitsets,
labelType={<ASTLabelType>}, ASTLabelType="object", superClass="TreeParser",
members={<actions.treeparser.members>}, filterMode) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
```

```
>>

/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start "<ruleName>"
procedure
T<grammar.recognizerName>.<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope(scope=it)>)
;
var
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <ruleLabelDefVars()>
begin
 <ruleLabelDefs()>
<if(trace)>
 TraceIn('<ruleName>_fragment', <ruleDescriptor.index>);
 try
   <block>
 finally
   TraceOut('<ruleName>_fragment', <ruleDescriptor.index>);
 end;
<else>
 <block>
<endif>
end;
// $ANTLR end "<ruleName>"
>>

synpredDecls(name) ::= <<
SynPredPointer <name>;<\n>
>>

synpred(name) ::= <<

function T<grammar.recognizerName>.<name>: Boolean;
var
 Start: Integer;
 Success: Boolean;
begin
 State.Backtracking := State.Backtracking + 1;
 <@start()>
 Start := Input.Mark;
```

```
 try
   <name>_fragment(); // can never throw exception
 except
   on RE: ERecognitionException do
     WriteLn('Impossible: ' + RE.ToString);
 end;
 Success := not State.Failed;
 Input.Rewind(Start);
 <@stop()>
 State.Backtracking := State.Backtracking - 1;
 State.Failed := False;
 Result := Success;
end;<\n>
>>


lexerSynpred(name) ::= <<
<synpred(name)>
>>


lexerSynpredDeclaration(name) ::= <<
function <name>: Boolean;
procedure <name>_fragment;
>>


synpredDeclaration(name) ::= <<
function <name>: Boolean;
procedure <name>_fragment;
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if ((State.Backtracking > 0) and AlreadyParsedRule(Input, <ruleDescriptor.index>)) then
 Exit(<ruleReturnValue()>);
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)><\n>if (State.Failed) then Exit(<ruleReturnValue()>);<\n><endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (State.Backtracking > 0) then
begin
 State.Failed := True;
 Exit(<ruleReturnValue()>);
end;<endif>
```

```
>>

genericParserRuleDeclaration(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<ruleAttributeScopeDeclaration(scope=ruleDescriptor.ruleScope)>
<returnScopeDeclaration(scope=ruleDescriptor.returnScope)>
public
<if(ruleDescriptor.hasMultipleReturnValues)>
 function <rule.ruleName>: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 function <rule.ruleName>: <returnType()>;<\n>
<else>
 procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
>>

genericParserRuleInterface(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.isSynPred)>
<else>
<if(ruleDescriptor.hasMultipleReturnValues)>
function <rule.ruleName>: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function <rule.ruleName>: <returnType()>;<\n>
<else>
procedure <rule.ruleName>;<\n>
<endif>
<endif>
<endif>
>>

genericParserRuleReturnType(rule, ruleDescriptor) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(ruleDescriptor.isSynPred)>
<else>
I<returnType()> = interface(I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope)
end;<\n>
<endif>
<endif>
>>

/** How to generate code for a rule.  This includes any return type
 * data aggregates required for multiple return values.
 */
```

```
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(scope=ruleDescriptor.returnScope)>

// $ANTLR start "<ruleName>"
(* <fileName>:<description> *)
<if(ruleDescriptor.hasMultipleReturnValues)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
I<returnType()>;
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
function T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>):
<returnType()>;
<else>
procedure
T<grammar.recognizerName>.<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
<endif>
<endif>

var
<ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
<if(ruleDescriptor.hasMultipleReturnValues)>
 RetVal: I<returnType()>;<\n>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
 RetVal: <returnType()>;<\n>
<else>
<endif>
<endif>
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <ruleDeclarationVars()>
 <ruleLabelDefVars()>
begin
 Locals.Initialize;
 try
   <if(trace)>TraceIn('<ruleName>', <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   <ruleLabelDefs()>
   <ruleDescriptor.actions.init>
   <@preamble()>
   try
    try
      <ruleMemoization(name=ruleName)>
      <block>
      <ruleCleanUp()>
      <(ruleDescriptor.actions.after):execAction()>
```

```
<if(exceptions)>
    <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
    <actions.(actionScope).rulecatch>
<else>
    except
     on RE: ERecognitionException do
     begin
      ReportError(RE);
      Recover(Input,RE);
      <@setErrorReturnValue()>
     end;<\n>
<endif>
<endif>
<endif>
    end;
  finally
   <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
   <memoize()>
   <ruleScopeCleanUp()>
   <finally>
  end;
  <@postamble()>
 finally
  Locals.Finalize;
 end;
 Exit(<ruleReturnValue()>);
end;
// $ANTLR end "<ruleName>"
>>

catch(decl,action) ::= <<
catch (<e.decl>)
{
  <e.action>
}
>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal := T<returnType()>.Create;
RetVal.Start := Input.LT(1);<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> := <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
```

```
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex := Input.Index();
<endif>
>>


ruleDeclarationVars() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name>: <a.type>;
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex: Integer;
<endif>
>>


ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Push(T<it>Scope.Create);}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Push(T<it.name>Scope.Create);}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{<it>Stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{<it.name>Stack.Pop;}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text> := nil;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text> := nil;}; separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDef(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text> := nil;}; separator="\n">
>>


ruleLabelDefVars() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]:{<it.label.text>: I<labelType>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]:{list_<it.label.text>: IList\<IANTLRInterface\>;};
separator="\n">
<ruleDescriptor.ruleLabels:ruleLabelDefVar(label=it); separator="\n">
<ruleDescriptor.ruleListLabels:{ll|<ll.label.text>: <ruleLabelType(referencedRule=ll.referencedRule)>;};
separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
```

```
    :{<it.label.text> := nil;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{List_<it.label.text> := nil;}; separator="\n"
>
>>


lexerRuleLabelDefDeclarations() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{<it.label.text>: I<labelType>;}; separator="\n"
>
<ruleDescriptor.charLabels:{int <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{List_<it.label.text>: IList;}; separator="\n"
>
>>


ruleReturnValue() ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
RetVal
<endif>
<else>
<! nil !>
<endif>
<endif>
>>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
RetVal.Stop := Input.LT(-1);
<endif>
<endif>
>>


memoize() ::= <<
<if(memoize)>
```

```
<if(backtracking)>
if (State.Backtracking > 0) then
 Memoize(Input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex);
<endif>
<endif>
>>


/** How to generate a rule in the lexer; naked blocks are used for
*  fragment rules.
*/
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
// $ANTLR start "<ruleName>"
<ruleDescriptor.parameterScope>
procedure
T<grammar.recognizerName>.m<ruleName>(<ruleDescriptor.parameterScope:parameterScope(scope=it)>);
var
 <ruleDescriptor.actions.vars>
 Locals: TLocalStorage;
 TokenType, Channel: Integer;
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
 <lexerRuleLabelDefDeclarations()>
begin
 Locals.Initialize;
 try
   <ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
   <if(trace)>TraceIn("<ruleName>", <ruleDescriptor.index>);<endif>
   <ruleScopeSetUp()>
   <ruleDeclarations()>
   try
<if(nakedBlock)>
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block><\n>
<else>
     TokenType := <ruleName>;
     Channel := DEFAULT_TOKEN_CHANNEL;
     <ruleMemoization(name=ruleName)>
     <lexerRuleLabelDefs()>
     <ruleDescriptor.actions.init>
     <block>
     <ruleCleanUp()>
     State.TokenType := TokenType;
     State.Channel := Channel;
     <(ruleDescriptor.actions.after):execAction()>
<endif>
   finally
     <if(trace)>TraceOut("<ruleName>", <ruleDescriptor.index>);<endif>
```

```
      <ruleScopeCleanUp()>
      <memoize()>
    end;
  finally
    Locals.Finalize;
  end;
end;
// $ANTLR end "<ruleName>"
>>


/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
procedure T<grammar.recognizerName>.mTokens;
var
 Alt: array [0..<grammar.numberOfDecisions>] of Integer;
begin
 <block>
end;


procedure T<grammar.recognizerName>.DoTokens;
begin
 mTokens;
end;
>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
<decls>
<@predecision()>
<decision>
<@postdecision()>
<@prebranch()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
end;
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
(* <fileName>:<description> *)
Alt[<decisionNumber>] := <maxAlt>;
```

```
<decls>
<@predecision()>
<decision>
<@postdecision()>
case Alt[<decisionNumber>] of
 <alts:altSwitchCase()>
end;
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
(* <fileName>:<description> *)
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
(* <fileName>:<description> *)
FCnt[<decisionNumber>] := 0;
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 case Alt[<decisionNumber>] of
   <alts:altSwitchCase()>
 else
   begin
    if (FCnt[<decisionNumber>] >= 1) then
      Break;
    <ruleBacktrackFailure()>
    raise EEarlyExitException.Create(<decisionNumber>, Input);
    <@earlyExitException()>
```

```
  end;
 end;
 Inc(FCnt[<decisionNumber>]);
end;
<@postloop()>
>>


positiveClosureBlockSingleAlt ::= positiveClosureBlock


/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
(* <fileName>:<description> *)
<decls>
<@preloop()>
while (True) do
begin
 Alt[<decisionNumber>] := <maxAlt>;
 <@predecision()>
 <decision>
 <@postdecision()>
 case Alt[<decisionNumber>] of
  <alts:altSwitchCase()>
 else
   Break;
 end;
end;
<@postloop()>
>>


closureBlockSingleAlt ::= closureBlock


/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
 *  does the jump to the code that actually matches that alternative.
 */
altSwitchCase() ::= <<
<i>:
 <@prealt()>
 <it><\n>
>>
```

```
/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
(* <fileName>:<description> *)
begin
 <@declarations()>
 <elements:element()>
 <rew>
 <@cleanup()>
end;
>>

/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element() ::= <<
<@prematch()>
<it.el>
>>

/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> := <endif>Match(Input, <token>,
FOLLOW_<token>_in_<ruleName><elementIndex>)<if(label)> as
I<labelType><endif>;<\n><checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

listLabel(label,elem) ::= <<
if (list_<label> = nil) then list_<label> := TList\<IANTLRInterface\>.Create;
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
```

```
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchRange(<a>, <b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label> := Input.LA(1);<\n>
<else>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
<endif>
if (<s>) then
begin
 Input.Consume;
 <postmatchCode>
 <if(!LEXER)>
 State.ErrorRecovery := False;<endif>
 <if(backtracking)>State.Failed := False;<endif>
end
else
begin
 <ruleBacktrackFailure()>
 FException := EMismatchedSetException.Create(nil, Input);
 <@mismatchedSetException()>
<if(LEXER)>
 Recover(FException);
 raise FException;<\n>
<else>
 raise FException;
 <! use following code to make it recover inline; remove throw mse;
 RecoverFromMismatchedSet(input,mse,FOLLOW_set_in_<ruleName><elementIndex>);
 !>
<endif>
end;<\n>
>>

matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
```

```
<matchSet(...)>
<listLabel(elem=label,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start'] := CharIndex;
Match(<string>); <checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
Locals.AsInteger['<label>Start'], CharIndex-1);
<else>
Match(<string>); <checkRuleBacktrackFailure()>
<endif>
>>


wildcard(label,elementIndex) ::= <<
<if(label)>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(label,elementIndex) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> := Input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
```

```
PushFollow(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)>
<label> := <if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=", ">);<\n>
<else>
<if(scope)>T<scope.recognizerName>(IANTLRObject(<scope:delegateName()>).Implementor).<endif><rule.name
>(<args; separator=", ">);<\n>
<endif>
State.FollowingStackPointer := State.FollowingStackPointer - 1;
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>


/** A lexer rule reference.
*
* The 'rule' argument was the target rule name, but now
* is type Rule, whose toString is same: the rule name.
* Now though you can access full rule descriptor stuff.
*/
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<label> := TCommonToken.Create(Input, TToken.INVALID_TOKEN_TYPE, TToken.DEFAULT_CHANNEL,
 Locals.AsInteger['<label>Start<elementIndex>'], CharIndex - 1);
<else>
<if(scope)>(<scope:delegateName()>.Implementor as T<scope.recognizerName>).<endif>m<rule.name>(<args;
separator=", ">); <checkRuleBacktrackFailure()>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
Locals.AsInteger['<label>Start<elementIndex>'] := CharIndex;
Match(EOF); <checkRuleBacktrackFailure()>
Locals['<label>'] := TCommonToken.Create(Input, EOF, TToken.DEFAULT_CHANNEL,
```

```
Locals.AsInteger['<label>Start<elementIndex>'], CharIndex-1);
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
>>


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (Input.LA(1) = TToken.DOWN) then
begin
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
end;
<else>
Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
<children:element()>
Match(Input, TToken.UP, nil);<\n><checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if (not (<evalPredicate(...)>)) then
begin
 <ruleBacktrackFailure()>
 raise EFailedPredicateException.Create(Input, '<ruleName>', '<description>');
end;<\n>
>>


// F i x e d  D F A  (if-then-else)


dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges; separator="\nelse ">
else
begin
<if(eotPredictsAlt)>
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<else>
 <ruleBacktrackFailure()>
 raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
```

```
<endif>
end;
>>


/** Same as a normal DFA state except that we don't examine lookahead
 * for the bypass alternative.  It delays error detection but this
 * is faster, smaller, and more what people expect.  For (X)? people
 * expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);<\n>
<edges; separator="\nelse ">;
>>


/** A DFA state that is actually the loopback decision of a closure
 * loop.  If end-of-token (EOT) predicts any of the targets then it
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(<k>);
<edges; separator="\nelse ">;<\n>
<if(eotPredictsAlt)>
<if(!edges)>
Alt[<decisionNumber>] := <eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
else
begin
 Alt[<decisionNumber>] := <eotPredictsAlt>;
end;<\n>
<endif>
<endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "Alt[<decisionNumber>] := <alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
 * enter to the target state.  To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
begin
 <targetState>
end <! no ; here !>
>>
```

// F i x e d D F A (switch case)

/** A DFA state where a SWITCH may be generated. The code generator
 * decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
else
 begin
<if(eotPredictsAlt)>
  Alt[<decisionNumber>] := <eotPredictsAlt>;
<else>
  <ruleBacktrackFailure()>
  <@noViableAltException()>
  raise ENoViableAltException.Create('<description>', <decisionNumber>, <stateNumber>, Input);<\n>
<endif>
 end;
end;<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n">
end;<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
case Input.LA(<k>) of
 <edges; separator="\n"><\n>
<if(eotPredictsAlt)>
else
 Alt[<decisionNumber>] := <eotPredictsAlt>;<\n>
<endif>
end;<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{<it>}; separator=",\n">:
 begin
  <targetState>
 end;
>>

// C y c l i c D F A

/** The code to initiate execution of a cyclic DFA; this is used

```
*  in the rule to predict an alt just like the fixed DFA case.
*  The <name> attribute is inherited via the parser, lexer, ...
*/
dfaDecision(decisionNumber,description) ::= <<
Alt[<decisionNumber>] := FDFA<decisionNumber>.Predict(Input);
>>


/* Dump DFA tables.
*/
cyclicDFADeclaration(dfa) ::= <<
strict protected
 type
  TDFA<dfa.decisionNumber> = class(TDFA)
  protected
    { IDFA }
    function Description: String; override;
  public
    constructor Create(const ARecognizer: IBaseRecognizer);
  end;
 var
  FDFA<dfa.decisionNumber>: IDFA;
<if(dfa.specialStateSTs)>
strict protected
 function DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S: Integer;
   const AInput: IIntStream): Integer;<endif>
>>


cyclicDFA(dfa) ::= <<
{ T<grammar.recognizerName>.TDFA<dfa.decisionNumber> }

constructor T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Create(const ARecognizer:
IBaseRecognizer);
const
 DFA<dfa.decisionNumber>_EOT = '<dfa.javaCompressedEOT; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_EOF = '<dfa.javaCompressedEOF; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MIN = '<dfa.javaCompressedMin; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_MAX = '<dfa.javaCompressedMax; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_ACCEPT = '<dfa.javaCompressedAccept; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_SPECIAL = '<dfa.javaCompressedSpecial; wrap="'+\n    '">';
 DFA<dfa.decisionNumber>_TRANSITION: array [0..<length(dfa.javaCompressedTransition)>-1] of String = (
   <dfa.javaCompressedTransition:{s|'<s; wrap="'+\n'">'}; separator=",\n">);
begin
 inherited Create;
 Recognizer := ARecognizer;
 DecisionNumber := <dfa.decisionNumber>;
 EOT := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOT);
 EOF := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_EOF);
 Min := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MIN);
```

```
  Max := TDFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_MAX);
  Accept := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_ACCEPT);
  Special := TDFA.UnpackEncodedString(DFA<dfa.decisionNumber>_SPECIAL);
  Transition := TDFA.UnpackEncodedStringArray(DFA<dfa.decisionNumber>_TRANSITION);
end;


function T<grammar.recognizerName>.TDFA<dfa.decisionNumber>.Description: String;
begin
 Result := '<dfa.description>';
end;<\n>
<if(dfa.specialStateSTs)>
function T<grammar.recognizerName>.DFA<dfa.decisionNumber>_SpecialStateTransition(const DFA: IDFA; S:
Integer;
 const AInput: IIntStream): Integer;
var
 Locals: TLocalStorage;
 <if(LEXER)>
 Input: IIntStream;
 <endif>
 <if(PARSER)>
 Input: ITokenStream;
 <endif>
 <if(TREE_PARSER)>
 Input: ITreeNodeStream;
 <endif>
 _S: Integer;
 NVAE: ENoViableAltException;
begin
 Result := -1;
 Locals.Initialize;
 try
  <if(LEXER)>
  Input := AInput;
  <endif>
  <if(PARSER)>
  Input := AInput as ITokenStream;
  <endif>
  <if(TREE_PARSER)>
  Input := AInput as ITreeNodeStream;
  <endif>
  _S := S;
  case S of
   <dfa.specialStateSTs:{state | <i0>: begin<! compressed special state numbers 0..n-1 !>
  <state> <\n>   end;}; separator="\n">
  end;
<if(backtracking)>
  if (State.Backtracking > 0) then
   begin
```

```
    State.Failed := True;
    Exit(-1);
  end;<\n>
<endif>
  NVAE := ENoViableAltException.Create(DFA.Description, <dfa.decisionNumber>, _S, Input);
  DFA.Error(NVAE);
  raise NVAE;
 finally
  Locals.Finalize;
 end;
end;<\n>
<endif>
>>
```

```
/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
FLA[<decisionNumber>,<stateNumber>] := Input.LA(1);<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
Locals.AsInteger['index<decisionNumber>_<stateNumber>'] := Input.Index;
Input.Rewind;<\n>
<endif>
S := -1;
<edges; separator="\nelse ">;
<if(semPredState)> <! return input cursor to state before we rewound !>
Input.Seek(Locals.AsInteger['index<decisionNumber>_<stateNumber>']);<\n>
<endif>
if (S >= 0) then
 Exit(S);
>>
```

```
/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> and (<predicates>)<endif>) then
 S := <targetStateNumber>
>>
```

```
/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
S := <targetStateNumber>;<\n>
>>
```

// D F A E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"

orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\" or \">)"

notPredicate(pred) ::= "!(<evalPredicate(...)>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "FLA[<decisionNumber>,<stateNumber>] = <atomAsInt>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "Input.LA(<k>) = <atomAsInt>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <<
((FLA[<decisionNumber>,<stateNumber>] \>= <lowerAsInt>) and (FLA[<decisionNumber>,<stateNumber>] \<=
<upperAsInt>))
>>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(Input.LA(<k>) \>=
<lowerAsInt>) and (Input.LA(<k>) \<= <upperAsInt>)"

setTest(ranges) ::= "<ranges; separator=\") or (\">"

// A T T R I B U T E S

globalAttributeScope(scope) ::= <<
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
<endif>
>>

globalAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
  I<scope.name>Scope = interface(IANTLRObject)
  end;
  T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
  protected
    <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
  end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;

```
<endif>
>>


ruleAttributeScopeDeclaration(scope) ::= <<
<if(scope.attributes)>
strict protected
 type
  I<scope.name>Scope = interface(IANTLRObject)
  end;
  T<scope.name>Scope = class(TANTLRObject, I<scope.name>Scope)
  protected
    <scope.attributes:{<it.name>: <it.type>;}; separator="\n">
  end;
strict protected
 <scope.name>Stack: IStackList\<I<scope.name>Scope\>;
<endif>
>>


ruleAttributeScope(scope) ::= <<
<! protected Stack <scope.name>Stack = new Stack();<\n> !>
>>


ruleAttributeScopeInit(scope) ::= <<
<if(scope)>
<scope.name>Stack := TStackList\<I<scope.name>Scope\>.Create;<\n>
<endif>
>>


returnStructName() ::= "<it.name>_return"

returnType() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor:returnStructName()>
<! I<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope !>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
<! Pointer/void !>
<endif>
<endif>
>>


/** Generate the C# type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
```

```
I<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
>>


delegateName() ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<csharpTypeInitMap.(typeName)>
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> := <initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;<\n>
>>


ruleLabelDefVar(label) ::= <<
<label.label.text>: <ruleLabelType(referencedRule=label.referencedRule)>;
>>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
{ T<ruleDescriptor:returnStructName()> }

<scope.attributes:{public <it.decl>;}; separator="\n">
<@ruleReturnMembers()>
<endif>
>>


returnScopeDeclaration(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
public
 type
   T<ruleDescriptor:returnStructName()> =
```

```
class(T<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope, I<ruleDescriptor:returnStructName()>)
  <scope.attributes:{public <it.decl>;}; separator="\n">
  <@ruleReturnMembers()>
  end;
<endif>
>>


parameterScope(scope) ::= <<
<scope.attributes:{<it.decl>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> := <expr>;"


scopeAttributeRef(scope,attr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name>
<else>
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name>
((<scope>_scope)<scope>_stack[<index>]).<attr.name>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name>
<endif>
<endif>
>>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <<
<if(negIndex)>
(<scope>Stack[<scope>Stack.Count-<negIndex>-1] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
<if(index)>
(<scope>Stack[<index>] as T<scope>Scope).<attr.name> := <expr>;<\n>
<else>
(<scope>Stack.Peek.Implementor as T<scope>Scope).<attr.name> := <expr>;<\n>
<endif>
<endif>
>>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>Stack"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
```

```
(IfThen(Assigned(<scope>),Def(<scope>).<attr.name>,<initValue(attr.type)>))
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
RetVal.<attr.name> := <expr>;
<else>
<attr.name> := <expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
tokenLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
tokenLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(Def(<scope>).CharPositionInLine)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
tokenLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"

ruleLabelPropertyRef_start(scope,attr) ::= "(IfThen(Assigned(<scope>), Def(<scope>).Start, nil) as I<labelType>)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(Def(<scope>).Stop as I<labelType>)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(Def(Def(<scope>).Tree as I<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
IfThen(Assigned(<scope>), Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(Def(<scope>).Start),
 Input.TreeAdaptor.GetTokenStopIndex(Def(<scope>).Start)), ")
```

```
<else>
IfThen(Assigned(<scope>), Input.ToString(
 (Def(<scope>).Start) as IToken,(Def(<scope>).Stop) as IToken), '')
<endif>
>>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> != null) ? <scope>.ST : null)"


/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"


lexerRuleLabelPropertyRef_type(scope,attr) ::= "(Def(<scope>).TokenType)"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(Def(<scope>).Line)"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(IfThen(Assigned(<scope>),Def(<scope>).CharPositionInLine,-1))"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(Def(<scope>).Channel)"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(Def(<scope>).TokenIndex)"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(Def(<scope>).Text)"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "(StrToIntDef(Def(<scope>).Text,0))"


// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "(RetVal.Start as I<labelType>)"
rulePropertyRef_stop(scope,attr) ::= "(RetVal.Stop as I<labelType>)"
rulePropertyRef_tree(scope,attr) ::= "(RetVal.Tree as I<ASTLabelType>)"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
Input.TokenStream.ToString(
 Input.TreeAdaptor.GetTokenStartIndex(RetVal.Start),
 Input.TreeAdaptor.GetTokenStopIndex(RetVal.Start))
<else>
Input.ToString(RetVal.Start as IToken,Input.LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "RetVal.ST"


lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "TokenType"
lexerRulePropertyRef_line(scope,attr) ::= "State.TokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "State.TokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "Channel"
lexerRulePropertyRef_start(scope,attr) ::= "State.TokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "StrToInt(<scope>.Text)"


// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "RetVal.Tree := <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "RetVal.ST := <expr>;"
```

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if (<actions.(actionScope).synpredgate>) then
begin
 <action>
end;
<else>
if (State.Backtracking = 0) then
begin
 <action>
end;<\n>
<endif>
<else>
<action>
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

bitset(name, words64) ::= <<
<name> := TBitSet.Create([<words64:{<it>};separator=",">]);<\n>
>>

bitsetDecl(name) ::= <<
<name>: IBitSet;<\n>
>>

codeFileExtension() ::= ".pas"

true() ::= "True"
false() ::= "False"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Delphi/Delphi.stg
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]
* Copyright (c) 2005-2008 Terence Parr
* All rights reserved.

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 *  hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
 */

parserMembers() ::= <<
 // Implement this function in your helper file to use a custom tree adaptor
 partial void InitializeTreeAdaptor();
 protected DebugTreeAdaptor adaptor;

 public ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
```

```
  this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
  <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>
 }
}<\n>
>>


parserCtorBody() ::= <<
<super.parserCtorBody()>
>>


createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>


@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
proxy.TreeAdaptor = adap;
>>


@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>


@ctorForPredefinedListener.superClassRef() ::= ": base( input, dbg )"


@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>


//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/ASTDbg.stg
No license file was found, but licenses were detected in source scan.

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 * THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** Templates for building ASTs during normal parsing.
 *
 * Deal with many combinations. Dimensions are:
 * Auto build or rewrite
 *   no label, label, list label (label/no-label handled together)
 *   child, root
 *   token, set, rule, wildcard
 *
 * The situation is not too bad as rewrite (->) usage makes ^ and !
 * invalid. There is no huge explosion of combinations.
 */

```
@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>


// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (state.backtracking == 0) {<endif>
<label>_tree = <createNodeFromToken(...)>;
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>


/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = <createNodeFromToken(...)>;
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>


/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


// SET AST
```

```
// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(backtracking)>if (<actions.(actionScope).synpredgate>)
<endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
```

```
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>


/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>


// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
>>


wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
>>


createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalO
```

ptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp2/ASTParser.stg
No license file was found, but licenses were detected in source scan.

/** Templates for building ASTs during normal parsing.
 *
 * Deal with many combinations. Dimensions are:

```
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 * The situation is not too bad as rewrite (->) usage makes ^ and !
 * invalid. There is no huge explosion of combinations.
 */

finishedBacktracking(block) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
    <block>
<else>
<block>
<endif>
<endif>
>>


@ruleBody.setErrorReturnValue() ::= <<
retval.tree = self._adaptor.errorNode(self.input, retval.start, self.input.LT(-1), re)
>>


// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
self._adaptor.addChild(root_0, <label>_tree)
})>
>>


/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"


/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.tokenRef(...)>
<finishedBacktracking({
<label>_tree = <createNodeFromToken(...)>
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>


/** ids+=ID! and output=AST */
```

```
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabel(elem=label,...)>
>>

/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <%
<super.matchSet(postmatchCode={<finishedBacktracking({self._adaptor.addChild(root_0,
<createNodeFromToken(...)>)})>}, ...)>
%>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
```

```
<super.matchSet(postmatchCode={<finishedBacktracking({root_0 =
self._adaptor.becomeRoot(<createNodeFromToken(...)>, root_0)})>}, ...)>
>>
```

// RULE REF AST

```
/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({self._adaptor.addChild(root_0, <label>.tree)})>
>>
```

```
/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"
```

```
/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<finishedBacktracking({root_0 = self._adaptor.becomeRoot(<label>.tree, root_0)})>
>>
```

```
/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>
```

```
/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(label, {<label>.tree})>
>>
```

```
/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>
```

// WILDCARD AST

```
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
self._adaptor.addChild(root_0, <label>_tree)
})>
>>
```

wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<finishedBacktracking({
<label>_tree = self._adaptor.createWithPayload(<label>)
root_0 = self._adaptor.becomeRoot(<label>_tree, root_0)
})>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<terminalOptions.node>(<label>) <! new MethodNode(IDLabel) !>
<else>
self._adaptor.createWithPayload(<label>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
self._adaptor.setTokenBoundaries(retval.tree, retval.start, retval.stop)
})>
>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python/ASTParser.stg
No license file was found, but licenses were detected in source scan.

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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
group AST;

```
@outputFile.imports() ::= <<
<@super.imports()><if(!TREE_PARSER)><! tree parser would already have imported !>
Antlr.Runtime.Tree,<\n><endif>
>>
```

```
@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>
```

```
@genericParser.membersConstructor() ::= <<
<@super.membersConstructor()>
<parserMembersConstructor()>
>>
```

```
@genericParser.membersImplementation() ::= <<
<@super.membersImplementation()>
<parserMembersImplementation()>
>>
```

```
/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
 strict protected
   FAdaptor: ITreeAdaptor;
   procedure SetAdaptor(const Value: ITreeAdaptor);
   property Adaptor: ITreeAdaptor read FAdaptor;
 public
   property TreeAdaptor: ITreeAdaptor read FAdaptor write SetAdaptor;


>>
```

```
parserMembersConstructor() ::= <<
```

```
FAdaptor := TCommonTreeAdaptor.Create;
>>


parserMembersImplementation() ::= <<
procedure T<grammar.recognizerName>.SetAdaptor(const Value: ITreeAdaptor);
begin
 FAdaptor := Value;
 <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor := FAdaptor;}>
end;
>>


@returnScope.ruleReturnMembers() ::= <<
function T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.GetTree: IANTLRInterface;
begin
 Result := FTree;
end;

procedure T<grammar.recognizerName>.T<ruleDescriptor:returnStructName()>.SetTree(const Value:
IANTLRInterface);
begin
 FTree := Value as I<ASTLabelType>;
end;
>>


@returnScopeDeclaration.ruleReturnMembers() ::= <<
strict private
 FTree: I<ASTLabelType>;
protected
 { IRuleReturnScope }
 function GetTree: IANTLRInterface; override;
 procedure SetTree(const Value: IANTLRInterface); override;
>>


/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
Root[0] := nil;<\n>
>>


ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
Root: array [0..63] of I<ASTLabelType>;
>>


ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree := nil;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree := nil;}; separator="\n">
```

```
<ruleDescriptor.allTokenRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>');}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites:{Locals['Stream_<it>'] :=
TRewriteRuleSubtreeStream.Create(Adaptor,'rule <it>');}; separator="\n">
>>


ruleLabelDefVars() ::= <<
<super.ruleLabelDefVars()>
<ruleDescriptor.tokenLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
<ruleDescriptor.tokenListLabels:{<it.label.text>_tree: I<ASTLabelType>;}; separator="\n">
>>
/** When doing auto AST construction, we must define some variables;
 * These should be turned off if doing rewrites.  This must be a "mode"
 * as a rule could have both rewrite and AST within the same alternative
 * block.
 */
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<endif>
<endif>
<endif>
>>


// T r a c k i n g   R u l e   E l e m e n t s

/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
>>


/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
 * to the tracking list stream_ID for use in the rewrite.
 */
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<token>'] as
IRewriteRuleElementStream).Add(<label>);<\n>
```

```
>>

/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>

wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule.name>'] as
IRewriteRuleElementStream).Add(<label>.Tree);<\n>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>(Locals['Stream_<rule>'] as
IRewriteRuleElementStream).Add(<label>.Tree);
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".Tree",...)>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
```

```
    referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements:          <referencedElementsDeep; separator=", ">
// token labels:      <referencedTokenLabels; separator=", ">
// rule labels:       <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels:  <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<prevRuleRootRef()>.Tree := Root[0];
<rewriteCodeLabels()>
Root[0] := Adaptor.GetNilNode as I<ASTLabelType>;
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.Tree = (<ASTLabelType>)adaptor.rulePostProcessing(root[0]);
input.ReplaceChildren(adaptor.GetParent(retval.Start),
             adaptor.GetChildIndex(retval.Start),
             adaptor.GetChildIndex(_last),
             retval.Tree);
<endif>
<endif>
<! if parser or rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.Tree := Root[0];<\n>
<endif>
<if(!rewriteMode)>
<prevRuleRootRef()>.Tree := Root[0];<\n>
<endif>
<if(backtracking)>
end;
<endif>
>>

rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor, 'token <it>', <it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{Locals['Stream_<it>'] := TRewriteRule<rewriteElementType>Stream.Create(Adaptor,'token <it>', list_<it>);};
  separator="\n"
```

```
>
<referencedRuleLabels:{
if Assigned(<it>) then
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', <it>.Tree)
else
 Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', nil);}; separator="\n">
<referencedRuleListLabels
  :{Locals['Stream_<it>'] := TRewriteRuleSubtreeStream.Create(Adaptor, 'token <it>', list_<it>);};
  separator="\n"
>
>>


/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 * list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
if (<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator="
or ">) then
begin
 <alt>
end;
<referencedElementsDeep:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset;<\n>}>
>>


rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,     // elements in immediately block; no nested blocks
 description) ::=
<<
(* <fileName>:<description> *)
while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>


rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
```

```
referencedElements,     // elements in immediately block; no nested blocks
description) ::=
<<
if (not (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">)) then
 raise ERewriteEarlyExitException.Create('');

while (<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).HasNext}; separator=" or
">) do
begin
 <alt>
end;
<referencedElements:{el | (Locals['Stream_<el>'] as IRewriteRuleElementStream).Reset();<\n>}>
>>


rewriteAlt(a) ::= <<
(* <a.description> *)
<if(a.pred)>
if (<a.pred>) then
begin
 <a.alt>
end<\n>
<else>
begin
 <a.alt>
end;<\n>
<endif>
>>


/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "Root[0] = null;"


rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
(* <fileName>:<description> *)
begin
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;
 <root:rewriteElement()>
 <children:rewriteElement()>
 Adaptor.AddChild(Root[<enclosingTreeLevel>], Root[<treeLevel>]);
end;<\n>
>>


rewriteElementList(elements) ::= "<elements:rewriteElement()>"


rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>
```

```
/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode);<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as
IRewriteRuleElementStream).NextNode(), Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createRewriteNodeFromElement(...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<createImaginaryNode(tokenType=token, ...)>, Root[<treeLevel>]) as
I<ASTLabelType>;<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
Root[0] = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
 * let's us refer to $rule to mean previous value.  I am reusing the
```

```
*  variable 'tree' sitting in retval struct to hold the value of Root[0] right
*  before I set it during rewrites.  The assign will be to retval.Tree.
*/
prevRuleRootRef() ::= "RetVal"

rewriteRuleRef(rule) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextTree());<\n>
>>


rewriteRuleRefRoot(rule) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<rule>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>


rewriteNodeAction(action) ::= <<
Adaptor.AddChild(Root[<treeLevel>], <action>);<\n>
>>


rewriteNodeActionRoot(action) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot(<action>, Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>


/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>


/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
Adaptor.AddChild(Root[<treeLevel>], (Locals['Stream_<label>'] as IRewriteRuleElementStream).NextTree());<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
Root[<treeLevel>] := Adaptor.BecomeRoot((Locals['Stream_<label>'] as IRewriteRuleElementStream).NextNode,
Root[<treeLevel>]) as I<ASTLabelType>;<\n>
>>


createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
T<terminalOptions.node>.Create(<tokenType><if(args)>, <args; separator=", "><endif>)
```

```
<else>
Adaptor.CreateNode(<tokenType>, <args; separator=", "><if(!args)>'<tokenType>'<endif>) as I<ASTLabelType>
<endif>
>>


createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>'] as IRewriteRuleElementStream).NextToken<if(args)>,
<args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
Adaptor.Create(<token>, <args; separator=", ">)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Delphi/AST.stg
No license file was found, but licenses were detected in source scan.

THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template overrides to add debugging to normal Java output;
 * If ASTs are built, then you'll also get ASTDbg.stg loaded.
 */
@outputFile.imports() ::= <<
<@super.imports()>
import org.antlr.runtime.debug.*;
import java.io.IOException;
>>

@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
 public static final String[] ruleNames = new String[] {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n\t\t", separator=", ">
 };<\n>
<endif>
 public static final boolean[] decisionCanBacktrack = new boolean[] {
  false, // invalid decision
  <grammar.decisions:{d | <d.dfa.hasSynPred; null="false">}; wrap="\n   ", separator=", ">
 };<\n>
<if(grammar.grammarIsRoot)> <! grammar imports other grammar(s) !>
 public int ruleLevel = 0;
 public int getRuleLevel() { return ruleLevel; }
 public void incRuleLevel() { ruleLevel++; }
 public void decRuleLevel() { ruleLevel--; }
<if(profile)>
 <ctorForProfilingRootGrammar()>
<else>
 <ctorForRootGrammar()>
<endif>
 <ctorForPredefinedListener()>
<else><! imported grammar !>
 public int getRuleLevel() { return <grammar.delegators:{g| <g:delegateName()>}>.getRuleLevel(); }
 public void incRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.incRuleLevel(); }
 public void decRuleLevel() { <grammar.delegators:{g| <g:delegateName()>}>.decRuleLevel(); }
 <ctorForDelegateGrammar()>
<endif>
<if(profile)>
 public boolean alreadyParsedRule(IntStream input, int ruleIndex) {
  int stopIndex = getRuleMemoization(ruleIndex, input.index());
  ((Profiler)dbg).examineRuleMemoization(input, ruleIndex, stopIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
  return super.alreadyParsedRule(input, ruleIndex);
 }

 @Override
 public void memoize(IntStream input,

```
     int ruleIndex,
     int ruleStartIndex)
 {
  ((Profiler)dbg).memoize(input, ruleIndex, ruleStartIndex,
<grammar.composite.rootGrammar.recognizerName>.ruleNames[ruleIndex]);
  super.memoize(input, ruleIndex, ruleStartIndex);
 }<\n>
<endif>
 protected boolean evalPredicate(boolean result, String predicate) {
  dbg.semanticPredicate(result, predicate);
  return result;
 }<\n>
>>


ctorForRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
<! Same except we add port number and profile stuff if root grammar !>
public <name>(<inputStreamType> input) {
 this(input, DebugEventSocketProxy.DEFAULT_DEBUGGER_PORT, new RecognizerSharedState());
}
public <name>(<inputStreamType> input, int port, RecognizerSharedState state) {
 super(input, state);
 <parserCtorBody()>
 <createListenerAndHandshake()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <@finally()>
}<\n>
>>


ctorForProfilingRootGrammar() ::= <<
<! bug: can't use <@super.members()> cut-n-paste instead !>
public <name>(<inputStreamType> input) {
 this(input, new Profiler(null), new RecognizerSharedState());
}
public <name>(<inputStreamType> input, DebugEventListener dbg, RecognizerSharedState state) {
 super(input, dbg, state);
 Profiler p = (Profiler)dbg;
 p.setParser(this);
 <parserCtorBody()>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state, this<grammar.delegators:{g|,
<g:delegateName()>}>);}; separator="\n">
 <@finally()>
}
<\n>
>>
```

```
/** Basically we don't want to set any dbg listeners are root will have it. */
ctorForDelegateGrammar() ::= <<
public <name>(<inputStreamType> input, DebugEventListener dbg, RecognizerSharedState
state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>) {
 super(input, dbg, state);
 <parserCtorBody()>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, this, this.state<grammar.delegators:{g|,
<g:delegateName()>}>);}; separator="\n">
}<\n>
>>

ctorForPredefinedListener() ::= <<
public <name>(<inputStreamType> input, DebugEventListener dbg) {
 <@superClassRef>super(input, dbg, new RecognizerSharedState());<@end>
<if(profile)>
 Profiler p = (Profiler)dbg;
 p.setParser(this);
<endif>
 <parserCtorBody()>
 <grammar.directDelegates:{g|<g:delegateName()> = new <g.recognizerName>(input, dbg, this.state,
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <@finally()>
}<\n>
>>

createListenerAndHandshake() ::= <<
<if(TREE_PARSER)>
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this, port, input.getTreeAdaptor());<\n>
<else>
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this, port, null);<\n>
<endif>
setDebugListener(proxy);
try {
 proxy.handshake();
}
catch (IOException ioe) {
 reportError(ioe);
}
>>

@genericParser.superClassName() ::= "Debug<@super.superClassName()>"

@rule.preamble() ::= <<
try { dbg.enterRule(getGrammarFileName(), "<ruleName>");
if ( getRuleLevel()==0 ) {dbg.commence();}
```

```
incRuleLevel();
dbg.location(<ruleDescriptor.tree.line>, <ruleDescriptor.tree.charPositionInLine>);<\n>
>>

@rule.postamble() ::= <<
dbg.location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);<\n>
}
finally {
 dbg.exitRule(getGrammarFileName(), "<ruleName>");
 decRuleLevel();
 if ( getRuleLevel()==0 ) {dbg.terminate();}
}<\n>
>>

@synpred.start() ::= "dbg.beginBacktrack(state.backtracking);"

@synpred.stop() ::= "dbg.endBacktrack(state.backtracking, success);"

// Common debug event triggers used by region overrides below

enterSubRule() ::=
 "try { dbg.enterSubRule(<decisionNumber>);<\n>"

exitSubRule() ::=
 "} finally {dbg.exitSubRule(<decisionNumber>);}<\n>"

enterDecision() ::=
 "try { dbg.enterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);<\n>"

exitDecision() ::=
 "} finally {dbg.exitDecision(<decisionNumber>);}<\n>"

enterAlt(n) ::= "dbg.enterAlt(<n>);<\n>"

// Region overrides that tell various constructs to add debugging triggers

@block.predecision() ::= "<enterSubRule()><enterDecision()>"

@block.postdecision() ::= "<exitDecision()>"

@block.postbranch() ::= "<exitSubRule()>"

@ruleBlock.predecision() ::= "<enterDecision()>"

@ruleBlock.postdecision() ::= "<exitDecision()>"

@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"
```

@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

@positiveClosureBlock.predecision() ::= "<enterDecision()>"

@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

@positiveClosureBlock.earlyExitException() ::=
 "dbg.recognitionException(eee);<\n>"

@closureBlock.preloop() ::= "<enterSubRule()>"

@closureBlock.postloop() ::= "<exitSubRule()>"

@closureBlock.predecision() ::= "<enterDecision()>"

@closureBlock.postdecision() ::= "<exitDecision()>"

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>" // altNum is arg of altSwitchCase

@element.prematch() ::=
 "dbg.location(<e.line>,<e.pos>);" // e is arg of element

@matchSet.mismatchedSetException() ::=
 "dbg.recognitionException(mse);"

@dfaState.noViableAltException() ::= "dbg.recognitionException(nvae);"

@dfaStateSwitch.noViableAltException() ::= "dbg.recognitionException(nvae);"

dfaDecision(decisionNumber,description) ::= <<
try {
 isCyclicDecision = true;
 <super.dfaDecision(...)>
}
catch (NoViableAltException nvae) {
 dbg.recognitionException(nvae);
 throw nvae;
}
>>

@cyclicDFA.errorMethod() ::= <<
public void error(NoViableAltException nvae) {
 dbg.recognitionException(nvae);
}

```
>>

/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
evalPredicate(<pred>,"<description>")
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/Dbg.stg
No license file was found, but licenses were detected in source scan.

```
/*
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/

/** Templates for building ASTs during normal parsing.
 *
 * Deal with many combinations.  Dimensions are:
 * Auto build or rewrite
 *   no label, label, list label  (label/no-label handled together)
 *   child, root
```

```
*    token, set, rule, wildcard
*
*  The situation is not too bad as rewrite (->) usage makes ^ and !
*  invalid. There is no huge explosion of combinations.
*/
group ASTParser;

@rule.setErrorReturnValue() ::= <<
RetVal.Tree := Adaptor.ErrorNode(Input, RetVal.Start as IToken,
 Input.LT(-1), RE) as I<ASTLabelType>;
>>

// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<label>_tree := <createNodeFromToken(...)>;
Adaptor.AddChild(Root[0], <label>_tree);
<if(backtracking)>
end;
<endif>
>>

/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<super.tokenRef(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<label>_tree := <createNodeFromToken(...)>;
Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
>>

/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
```

```
<listLabel(elem=label,...)>
>>


/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,terminalOptions,elementIndex) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then
<endif>Adaptor.AddChild(Root[0], <createNodeFromToken(...)>);})>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
>>


matchSetBang(s,label,elementIndex,postmatchCode) ::= "<super.matchSet(...)>"


// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(label)>
<label> := Input.LT(1) as I<labelType>;<\n>
<endif>
<super.matchSet(..., postmatchCode={<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] :=
Adaptor.BecomeRoot(<createNodeFromToken(...)>, Root[0]) as I<ASTLabelType>;})>
```

```
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Adaptor.AddChild(Root[0], <label>.Tree);
>>

/** rule! is same as normal rule ref */
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[0] := Adaptor.BecomeRoot(<label>.Tree, Root[0])
as I<ASTLabelType>;
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabel(elem=label+".Tree",...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>

// WILDCARD AST

wildcard(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Adaptor.AddChild(Root[0], <label>_tree);
```

```
<if(backtracking)>
end;
<endif>
>>


wildcardBang(label,elementIndex) ::= "<super.wildcard(...)>"


wildcardRuleRoot(label,elementIndex) ::= <<
<super.wildcard(...)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
 <label>_tree := Adaptor.CreateNode(<label>) as I<ASTLabelType>;
 Root[0] := Adaptor.BecomeRoot(<label>_tree, Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
>>


createNodeFromToken(label,terminalOptions) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create(<label>) <! new MethodNode(IDLabel) !>
<else>
Adaptor.CreateNode(<label>) as I<ASTLabelType>
<endif>
>>


ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
<if(!TREE_PARSER)>
Adaptor.SetTokenBoundaries(RetVal.Tree, RetVal.Start as IToken, RetVal.Stop as IToken);
<endif>
<if(backtracking)>
<\n>end;
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Delphi/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to normal C output;
 *  If ASTs are built, then you'll also get ASTDbg.stg loaded.
 */
@genericParser.members() ::= <<
<if(grammar.grammarIsRoot)>
const char *
ruleNames[] =
 {
  "invalidRule", <grammar.allImportedRules:{rST | "<rST.name>"}; wrap="\n  ", separator=", ">
 };<\n>
<endif>
<if(grammar.grammarIsRoot)> <! grammar imports other grammar(s) !>
static ANTLR3_UINT32 ruleLevel = 0;
static ANTLR3_UINT32 getRuleLevel()
{
 return ruleLevel;
}
static void incRuleLevel()
```

```
{
 ruleLevel++;
}
static void decRuleLevel()
{
 ruleLevel--;
}
<else> <! imported grammar !>
static ANTLR3_UINT32
getRuleLevel()
{
 return <grammar.delegators:{g| <g:delegateName()>}>->getRuleLevel();
}
static void incRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>->incRuleLevel();
}
static void
decRuleLevel()
{
 <grammar.delegators:{g| <g:delegateName()>}>.decRuleLevel();
}
<endif>
<if(profile)>
// Profiling not yet implemented for C target
//
<endif>
<if(grammar.grammarIsRoot)>
<ctorForPredefinedListener()>
<else>
<ctorForDelegateGrammar()>
<endif>

static ANTLR3_BOOLEAN
evalPredicate(p<name> ctx, ANTLR3_BOOLEAN result, const char * predicate)
{
  DBG->semanticPredicate(DBG, result, predicate);
  return result;
}<\n>
>>

@genericParser.debugStuff() ::= <<
<if(grammar.grammarIsRoot)>
<createListenerAndHandshake()>
<endif>
>>

ctorForProfilingRootGrammar() ::= <<
```

```
>>

/** Basically we don't want to set any dbg listeners as root will have it. */
ctorForDelegateGrammar() ::= <<

>>

ctorForPredefinedListener() ::= <<

>>

createListenerAndHandshake() ::= <<
{
 // DEBUG MODE code
 //
 pANTLR3_DEBUG_EVENT_LISTENER  proxy;
 proxy = antlr3DebugListenerNew();
 proxy->grammarFileName = INPUT->tokenSource->strFactory->newStr8(INPUT->tokenSource->strFactory,
(pANTLR3_UINT8)ctx->getGrammarFileName());

<if(TREE_PARSER)>
 proxy->adaptor = ADAPTOR;
<endif>
 PARSER->setDebugListener(PARSER, proxy);

 // Try to connect to the debugger (waits forever for a connection)
 //
 proxy->handshake(proxy);

 // End DEBUG MODE code
 //
}
>>


@rule.preamble() ::= <<
if ( getRuleLevel()==0 )
{
 DBG->commence(DBG);
}
DBG->enterRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
incRuleLevel();
DBG->location(DBG, <ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>);<\n>
>>

@rule.postamble() ::= <<
DBG->location(DBG, <ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.column>);<\n>
DBG->exitRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
```

```
decRuleLevel();
if ( getRuleLevel()==0 )
{
 DBG->terminate(DBG);
}
<\n>
>>

@checkRuleBacktrackFailure.debugClean() ::= <<
DBG->exitRule(DBG, getGrammarFileName(), (const char *)"<ruleName>");
decRuleLevel();
>>

@synpred.start() ::= "DBG->beginBacktrack(DBG, BACKTRACKING);"

@synpred.stop() ::= "DBG->endBacktrack(DBG, BACKTRACKING, success);"

// Common debug event triggers used by region overrides below

enterSubRule() ::=
  "DBG->enterSubRule(DBG, <decisionNumber>);<\n>"

exitSubRule() ::=
  "DBG->exitSubRule(DBG, <decisionNumber>);<\n>"

enterDecision() ::=
  "DBG->enterDecision(DBG, <decisionNumber>);<\n>"

exitDecision() ::=
  "DBG->exitDecision(DBG, <decisionNumber>);<\n>"

enterAlt(n) ::= "DBG->enterAlt(DBG, <n>);<\n>"

// Region overrides that tell various constructs to add debugging triggers

@block.predecision() ::= "<enterSubRule()><enterDecision()>"

@block.postdecision() ::= "<exitDecision()>"

@block.postbranch() ::= "<exitSubRule()>"

@ruleBlock.predecision() ::= "<enterDecision()>"

@ruleBlock.postdecision() ::= "<exitDecision()>"

@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"

@blockSingleAlt.prealt() ::= "<enterAlt(n=\"1\")>"
```

@positiveClosureBlock.preloop() ::= "<enterSubRule()>"

@positiveClosureBlock.postloop() ::= "<exitSubRule()>"

@positiveClosureBlock.predecision() ::= "<enterDecision()>"

@positiveClosureBlock.postdecision() ::= "<exitDecision()>"

@positiveClosureBlock.earlyExitException() ::=
  "DBG->recognitionException(DBG, EXCEPTION);<\n>"

@closureBlock.preloop() ::= "<enterSubRule()>"

@closureBlock.postloop() ::= "<exitSubRule()>"

@closureBlock.predecision() ::= "<enterDecision()>"

@closureBlock.postdecision() ::= "<exitDecision()>"

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>"

@element.prematch() ::=
  "DBG->location(DBG, <e.line>, <e.pos>);" // e is arg of element

@matchSet.mismatchedSetException() ::=
  "DBG->recognitionException(DBG, EXCEPTION);"

@newNVException.noViableAltException() ::= "DBG->recognitionException(DBG, EXCEPTION);"

dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
if (HASEXCEPTION())
{
 DBG->recognitionException(DBG, EXCEPTION);
  goto rule<ruleDescriptor.name>Ex;
}
<checkRuleBacktrackFailure()>
>>

@cyclicDFA.errorMethod() ::= <<
//static void
//dfaError(p<name> ctx)
//{
//   DBG->recognitionException(DBG, EXCEPTION);
//}
>>

```
/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
evalPredicate(ctx, <pred>, (const char *)"<description>")
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/Dbg.stg
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```
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*/

/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations.  Dimensions are:
* Auto build or rewrite
*   no label, label, list label  (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
```

```
*/

/* addition memVars for returnscopes */
@returnScopeInterface.memVars() ::= <<
/* ASTTreeParser returnScopeInterface.memVars */
<recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** the interface of returnScope methodsDecl */
@returnScopeInterface.methodsDecl() ::= <<
/* ASTTreeParser returnScopeInterface.methodsDecl */
- (<recognizer.ASTLabelType; null="CommonTree"> *)getTree;
- (void) setTree:(<recognizer.ASTLabelType; null="CommonTree"> *)aTree;<\n>
>>

/** the implementation of returnScope methods */
@returnScope.methods() ::= <<
/* ASTTreeParser returnScope.methods */
- (<ASTLabelType> *)getTree
{
  return tree;
}

- (void) setTree:(<ASTLabelType> *)aTree
{
  if (tree != aTree) {
    if (tree != nil) [tree release];
    if (aTree != nil) [aTree retain];
    tree = aTree;
  }
}

- (void) dealloc
{
  [self setTree:nil];
  [super dealloc];
}

@synthesize tree;
>>

@returnScopeProperties() ::= <<
@property (retain) <recognizer.ASTLabelType; null="CommonTree"> *tree;
>>

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
/* ASTTreeParser ruleDeclarations */
```

```
<super.ruleDeclarations()>
<ASTLabelType> *_first_0 = nil;
<ASTLabelType> *_last = nil;<\n>
>>


/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
/* ASTTreeParser noRewrite */
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType> *)_first_0;
if ( [treeAdaptor getParent:retval.tree] != nil && [treeAdaptor isNil:[treeAdaptor getParent:retval.tree]] ) )
   retval.tree = (<ASTLabelType> *)[treeAdaptor getParent:retval.tree];
<endif>
<if(backtracking)>}<endif>
>>


/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
/* ASTTreeParser tree */
_last = (<ASTLabelType> *)[input LT:1];
{
<ASTLabelType> *_save_last_<treeLevel> = _last;
<ASTLabelType> *_first_<treeLevel> = nil;
<if(!rewriteMode)>
<ASTLabelType> *root_<treeLevel> = [[[[treeAdaptor class] newEmptyTree] retain];
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==nil ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( [input LA:1] == TokenTypeDOWN ) {
  [self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
  <children:element()>
  [self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
}
```

```
<else>
[self match:input TokenType:TokenTypeDOWN Follow:nil]; <checkRuleBacktrackFailure()>
<children:element()>
[self match:input TokenType:TokenTypeUP Follow:nil]; <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
[treeAdaptor addChild:root_<treeLevel> toTree:root_<enclosingTreeLevel>];
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
>>


/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRef */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
  <label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
  <label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
  [treeAdaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==nil ) _first_<treeLevel> = <label>;
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefAndListLabel */
<tokenRef(...)>
<listLabel(elem=label,...)>
```

```
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex) ::= <<
/* ASTTreeParser tokenRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[treeAdaptor dupNode:<label>];
<endif><\n>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>}<endif>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser tokenRefRuleRootAndListLabel */
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
/* ASTTreeParser wildcard */
_last = (<ASTLabelType> *)[input LT:1];
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType> *)[adaptor dupTree:<label>];
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>;
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSet */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(postmatchCode={
```

```
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
[adaptor addChild:<label>_tree toTree:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
/* ASTTreeParser matchRuleBlockSet */
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>


matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
/* ASTTreeParser matchSetBang */
_last = (<ASTLabelType> *)[input LT:1];
<super.matchSet(...)>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
/* ASTTreeParser matchSetRuleRoot */
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = [<terminalOptions.node> new<terminalOptions.node>:<label>];
<else>
<label>_tree = (<ASTLabelType> *)[adaptor dupNode:<label>];
<endif><\n>
root_<treeLevel> = (<ASTLabelType> *)[adaptor becomeRoot:<label>_tree old:root_<treeLevel>];
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRef */
```

```
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
  [treeAdaptor addChild:<label>.tree toTree:root_<treeLevel>];
<else> <! rewrite mode !>
if ( _first_<treeLevel> == nil ) _first_<treeLevel> = <label>.tree;
<endif>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefAndListLabel */
<ruleRef(...)>
<! <listLabel(elem = "["+label+" getTree]",...)> !>
<listLabel(elem = {[<label> getTree]},...)>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRoot */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking == 0 ) <endif>
root_<treeLevel> = (<ASTLabelType> *)[treeAdaptor becomeRoot:<label>.tree old:root_<treeLevel>];
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootAndListLabel */
<ruleRefRuleRoot(...)>
<listLabel(elem = {[<label> getTree]},...)>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrack(...)>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefTrackAndListLabel(...)>
```

```
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootTrack */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
/* ASTTreeParser ruleRefRuleRootTrackAndListLabel */
_last = (<ASTLabelType> *)[input LT:1];
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
/* ASTTreeParser createRewriteNodeFromElement */
<if(terminalOptions.node)>
<! new <terminalOptions.node>(stream_<token>.nextNode()) !>
[[[<terminalOptions.node>(stream_<token> alloc] init] nextNode];
<else>
<! stream_<token>.nextNode() !>
[stream_<token> nextNode]
<endif>
>>

ruleCleanUp() ::= <<
/* ASTTreeParser ruleCleanUp */
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = (<ASTLabelType> *)[treeAdaptor rulePostProcessing:root_0];
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ObjC/ASTTreeParser.stg
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```
/*
 * [The "BSD license"]
 * Copyright (c) 2007-2008 Johannes Luber
```

/** Template overrides to add debugging to AST stuff. Dynamic inheritance
 * hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
 */

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;

 public ITreeAdaptor TreeAdaptor
 {
  get
  {
   return adaptor;
  }
  set
  {
<if(grammar.grammarIsRoot)>
   this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
   this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif><\n>
   <grammar.directDelegates:{g|<g:delegateName()>.TreeAdaptor = this.adaptor;}>

```
  }
 }<\n>
>>


parserCtorBody() ::= <<
<super.parserCtorBody()>
>>


createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy = new DebugEventSocketProxy( this, port,
<if(TREE_PARSER)>input.TreeAdaptor<else>adaptor<endif> );
DebugListener = proxy;
<inputStreamType> = new Debug<inputStreamType>( input, proxy );
try
{
 proxy.Handshake();
}
catch ( IOException ioe )
{
 ReportError( ioe );
}
>>


@ctorForRootGrammar.finally() ::= <<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
proxy.TreeAdaptor = adap;
>>


@ctorForProfilingRootGrammar.finally() ::=<<
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;
>>


@ctorForPredefinedListener.superClassRef() ::= ": base( input, dbg )"


@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)><! don't create new adaptor for delegates !>
ITreeAdaptor adap = new CommonTreeAdaptor();
TreeAdaptor = adap;<\n>
<endif>
>>


//@rewriteElement.pregen() ::= "dbg.Location( <e.line>, <e.pos> );"


Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp2/ASTDbg.stg
```

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*/

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* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CSharp3Target.java
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   derived from this software without specific prior written permission.

```
/*
 * This code generating template and the associated Cpp runtime was produced by:
 * Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim Idle )
 */
cTypeInitMap ::= [
 "int"    : "0",          // Integers    start out being 0
 "long"   : "0",          // Longs       start out being 0
 "float"  : "0.0",        // Floats      start out being 0
 "double" : "0.0",        // Doubles     start out being 0
 "bool"   : "false",  // Booleans    start out being Antlr C for false
 "byte"   : "0",          // Bytes       start out being 0
 "short"  : "0",          // Shorts      start out being 0
 "char"   : "0"           // Chars       start out being 0
]

leadIn(type) ::=
<<
/** \file
 *  This <type> file was generated by $ANTLR version <ANTLRVersion>
 *
 *     - From the grammar source file : <fileName>
 *     -                    On : <generatedTimestamp>
<if(LEXER)>
 *     -            for the lexer : <name>Lexer
<endif>
<if(PARSER)>
 *     -            for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
```

```
*    -          for the tree parser : <name>TreeParser
<endif>
*
* Editing it, at least manually, is not wise.
*
* C++ language generator and runtime by Gokulakannan Somasundaram ( heavy lifting from C Run-time by Jim
Idle )
*
*
>>

/** The overall file structure of a recognizer; stores methods for rules
*  and cyclic DFAs plus support code.
*/
outputFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
        superClass,
        literals
        ) ::=
<<
<leadIn("C++ source")>
*/
// [The "BSD license"]
// Copyright (c) 2005-2009 Gokulakannan Somasundaram, ElectronDB
```

```
<if(actions.(actionScope).header)>

/* =============================================================================
 * This is what the grammar programmer asked us to put at the top of every file.
 */
<actions.(actionScope).header>
/* End of Header action.
 * =============================================================================
 */
<endif>

/* ----------------------------------------
 * Include the ANTLR3 generated header file.
 */
#include    "<name>.hpp"
<if(trace)>
#include \<iostream>
<endif>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include "<g.recognizerName>.hpp" }; separator="\n">
<endif>
```

```
<actions.(actionScope).postinclude>
/* ------------------------------------- */

<docComment>

<if(literals)>

<beginNamespace(actions)>

/** String literals used by <name> that we must do things like MATCHS() with.
 *  C will normally just lay down 8 bit characters, and you can use L"xxx" to
 *  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
 *  we perform this little trick of defining the literals as arrays of UINT32
 *  and passing in the address of these.
 */
<literals:{it | static ANTLR_UCHAR lit_<i>[]  = <it>;}; separator="\n">

<endNamespace(actions)>

<endif>

/* ================================================================================== */

/* ===============================================================================
 * Start of recognizer
 */

<recognizer>

/* End of code
 * ===============================================================================
 */

>>
headerFileExtension() ::= ".hpp"

beginNamespace(actions) ::= <%
 <if(actions.(actionScope).namespace)>
 namespace <actions.(actionScope).namespace> {
 <endif>
%>

endNamespace(actions) ::= <%
 <if(actions.(actionScope).namespace)>
 }
 <endif>
%>
```

```
headerFile( LEXER,
      PARSER,
      TREE_PARSER,
      actionScope,
      actions,
      docComment,
      recognizer,
      name,
      tokens,
      tokenNames,
      rules,
      cyclicDFAs,
      bitsets,
      buildTemplate,
      buildAST,
      rewriteMode,
      profile,
      backtracking,
      synpreds,
      memoize,
      numRules,
      fileName,
      ANTLRVersion,
      generatedTimestamp,
      trace,
      scopes,
      superClass,
      literals
   ) ::=
<<
<leadIn("C++ header")>
<if(PARSER)>
* The parser <mainName()> has the callable functions (rules) shown below,
<endif>
<if(LEXER)>
* The lexer <mainName()> has the callable functions (rules) shown below,
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()> has the callable functions (rules) shown below,
<endif>
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
```

* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors and so on.
*
*/
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#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* ==
* Standard antlr3 C++ runtime definitions
*/
#include \<antlr3.hpp>

/* End of standard antlr 3 runtime definitions
* ==
*/

<actions.(actionScope).includes>

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//

```
<recognizer.grammar.delegates: {g|#include "<g.recognizerName>.hpp"}; separator="\n">

<endif>


<actions.(actionScope).header>

#ifdef WIN32
// Disable: Unreferenced parameter,        - Rules with parameters that are not used
//          constant conditional,          - ANTLR realizes that a prediction is always true (synpred usually)
//          initialized but unused variable    - tree rewrite variables declared but not needed
//          Unreferenced local variable      - lexer rule declares but does not always use _type
//          potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning( disable : 4100 )
#pragma warning( disable : 4101 )
#pragma warning( disable : 4127 )
#pragma warning( disable : 4189 )
#pragma warning( disable : 4505 )
#pragma warning( disable : 4701 )
#endif
<if(backtracking)>

/* =======================
 * BACKTRACKING IS ENABLED
 * =======================
 */
<endif>

<beginNamespace(actions)>

<if(recognizer.grammar.delegators)>
// Include delegator definition classes
//
<recognizer.grammar.delegators: {g|class <g.recognizerName>; }; separator="\n">
<endif>

<actions.(actionScope).traits>
typedef <name>Traits <name>ImplTraits;

<rules:{r | <if(r.ruleDescriptor.isSynPred)> struct <r.ruleDescriptor.name> {\}; <endif>}; separator="\n">
```

```
class <name>Tokens
{
public:
 /** Symbolic definitions of all the tokens that the <grammarType()> will work with.
  *
  * Antlr will define EOF, but we can't use that as it it is too common in
  * in C header files and that would be confusing. There is no way to filter this out at the moment
  * so we just undef it here for now. That isn't the value we get back from C recognizers
  * anyway. We are looking for ANTLR_TOKEN_EOF.
  */
 enum Tokens
 {
  EOF_TOKEN = <name>ImplTraits::CommonTokenType::TOKEN_EOF
  <tokens:{it | , <it.name> = <it.type> }; separator="\n">
 };

};

/** Context tracking structure for <mainName()>
*/
class <name> : public <componentBaseType()>, public <name>Tokens
{
public:
 typedef <name>ImplTraits ImplTraits;
 typedef <name> ComponentType;
 typedef ComponentType::StreamType StreamType;
 typedef <componentBaseType()> BaseType;
 typedef ImplTraits::RecognizerSharedStateType\<StreamType> RecognizerSharedStateType;
 typedef StreamType InputType;
<if(recognizer.filterMode)>
 static const bool IsFiltered = true;
<else>
 static const bool IsFiltered = false;
<endif>

 <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
 <rules:{r | <if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)><endif>}>

private:
<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
     {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
     {g|<g.recognizerName>*  m_<g:delegateName()>;}; separator="\n">
<endif>
```

```
<scopes:{it | <if(it.isDynamicGlobalScope)>
  <globalAttributeScopeDef(it)>
<endif>}; separator="\n\n">
<rules: {r |<if(r.ruleDescriptor.ruleScope)>
  <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>
  <@members>
  <@end>


public:
  <name>(InputType* instream<recognizer.grammar.delegators:{g|, <g.recognizerName>*
<g:delegateName()>}>);
  <name>(InputType* instream, RecognizerSharedStateType* state<recognizer.grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>);

  void init(InputType* instream <recognizer.grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>
);

  <actions.(actionScope).context>

<if(LEXER)>
<if(recognizer.filterMode)>
  void  memoize(ANTLR_MARKER ruleIndex, ANTLR_MARKER ruleParseStart);
  bool  alreadyParsedRule(ANTLR_MARKER ruleIndex);
  <filteringNextToken()>
<endif>
  <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
m<r.ruleDescriptor.name>( <r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
  <rules:{r | <if(r.ruleDescriptor.isSynPred)> <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred(
antlr3::ClassForwarder\< <r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
  void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<endif>
<if(!LEXER)>
  <rules:{r | <headerReturnScope(ruleDescriptor=r.ruleDescriptor)>}>
  <rules:{r | <if(!r.ruleDescriptor.isSynPred)> <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<r.ruleDescriptor.name> (<r.ruleDescriptor.parameterScope:parameterScope()>); <endif>}; separator="\n">
  <rules:{r | <if(r.ruleDescriptor.isSynPred)> <headerReturnType(ruleDescriptor=r.ruleDescriptor)> msynpred(
antlr3::ClassForwarder\< <r.ruleDescriptor.name> > <r.ruleDescriptor.parameterScope:parameterScope()>);
  void m<r.ruleDescriptor.name>_fragment (<r.ruleDescriptor.parameterScope:parameterScope()>);<endif>};
separator="\n">
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
  // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
  <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
<endif>
```

```
  const char *    getGrammarFileName();
  void            reset();
  ~<name>();

};

// Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
<if(!recognizer.grammar.grammarIsRoot)>
extern ANTLR_UINT8*   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>


/* End of token definitions for <name>
 * =============================================================================
 */

<endNamespace(actions)>

#endif

/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

grammarType() ::= <%
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
%>

componentType() ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType
```

```
<endif>
>>

componentBaseType() ::= <%
<if(PARSER)>
<name>ImplTraits::BaseParserType
<endif>
<if(LEXER)>
<name>ImplTraits::BaseLexerType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::BaseTreeParserType
<endif>
%>

streamType() ::= <<
<if(PARSER)>
<name>ImplTraits::ParserType::StreamType
<endif>
<if(LEXER)>
<name>ImplTraits::LexerType::StreamType
<endif>
<if(TREE_PARSER)>
<name>ImplTraits::TreeParserType::StreamType
<endif>
>>


mainName() ::= <%
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
%>

headerReturnScope(ruleDescriptor) ::= "<returnScope(scope=ruleDescriptor.returnScope)>"

headerReturnType(ruleDescriptor) ::= <%
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
<else>
<returnType()>
```

```
<endif>
<else>
<returnType()>
<endif>
%>

// Produce the lexer output
//
lexer(  grammar,
 name,
      tokens,
      scopes,
      rules,
      numRules,
      filterMode,
      superClass,
      labelType="ImplTraits::CommonTokenType*") ::= <<

using namespace antlr3;

<beginNamespace(actions)>

<if(filterMode)>

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
 * lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
 * than just BACKTRACKING. In some cases this might generate code akin to:
 *   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
 */
void <name>::memoize(ANTLR_MARKER  ruleIndex, ANTLR_MARKER  ruleParseStart)
{
 BaseType* base = this;
 if ( this->get_backtracking()>1 )
  base->memoize( ruleIndex, ruleParseStart );

}

bool <name>::alreadyParsedRule(ANTLR_MARKER ruleIndex)
{
 BaseType* base = this;
 if ( this->get_backtracking() > 1 )
  return base->haveParsedRule(ruleIndex);
 return false;
}

<endif>

/* ========================================================================
```

```
 * Lexer matching rules end.
 * ===========================================================================
 */

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

<name>::~<name>()
{
<if(memoize)>
 RuleMemoType* rulememo = this->getRuleMemo();
 if(rulememo != NULL)
 {
  delete rulememo;
  this->setRuleMemo(NULL);
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
     {g| m_<g:delegateName()>->set_lexstate(NULL);
     delete m_<g:delegateName()>; }; separator="\n">
<endif>
}

void
<name>::reset()
{
  this->get_rec()->reset();
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}

/** \brief Create a new lexer called <name>
*
* \param[in]   instream Pointer to an initialized input stream
```

```
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, NULL)
{
 // See if we can create a new lexer with the standard constructor
 //
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
<name>::<name>(StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
:<name>ImplTraits::BaseLexerType(ANTLR_SIZE_HINT, instream, state)
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>} >);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>} >)
{
  /* ------------------------------------------------------------------
   * Memory for basic structure is allocated, now to fill in
   * in base ANTLR3 structures. We initialize the function pointers
   * for the standard ANTLR3 lexer function set, but upon return
   * from here, the programmer may set the pointers to provide custom
   * implementations of each function.
   *
   * We don't use the macros defined in <name>.h here so you can get a sense
   * of what goes where.
   */

<if(memoize)>
<if(grammar.grammarIsRoot)>
  // Create a LIST for recording rule memos.
  //
  this->setRuleMemo( new IntTrie(15) ); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>
```

```
<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
      {g|m_<g:delegateName()> = new <g.recognizerName>(instream, this->get_lexstate(),
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
      {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
<endif>
}

<if(cyclicDFAs)>

/* ========================================================================
 * DFA tables for the lexer
 */
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ========================================================================
 * End of DFA tables for the lexer
 */
<endif>

/* ========================================================================
 * Functions to match the lexer grammar defined tokens from the input stream
 */

<rules; separator="\n\n">

/* ========================================================================
 * Lexer matching rules end.
 * ========================================================================
 */
<if(synpreds)>

/* ========================================================================
 * Lexer syntactic predicates
 */
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* ========================================================================
 * Lexer syntactic predicates end.
 * ========================================================================
 */
```

```
<endif>

/* End of Lexer code
 * =============================================
 * =============================================
 */

<endNamespace(actions)>

>>


filteringNextToken() ::= <<
<name>ImplTraits::CommonTokenType*
<name>ImplTraits::TokenSourceType::nextToken()
{
    LexerType*   lexer;
    typename LexerType::RecognizerSharedStateType* state;

    lexer   = this->get_super();
    state = lexer->get_lexstate();

    /* Get rid of any previous token (token factory takes care of
     * any deallocation when this token is finally used up.
     */
    state->set_token_present( false );
    state->set_error( false );     /* Start out without an exception */
    state->set_failedflag(false);

    /* Record the start of the token in our input stream.
     */
    state->set_tokenStartCharIndex( lexer->index();
    state->set_tokenStartCharPositionInLine( lexer->getCharPositionInLine() );
    state->set_tokenStartLine( lexer->getLine() );
    state->set_text("");

    /* Now call the matching rules and see if we can generate a new token
     */
    for (;;)
    {
    if (lexer->LA(1) == ANTLR_CHARSTREAM_EOF)
    {
    /* Reached the end of the stream, nothing more to do.
     */
    CommonTokenType&    teof = m_eofToken;

    teof.set_startIndex(lexer->getCharIndex());
    teof.set_stopIndex(lexer->getCharIndex());
```

```
  teof.setLine(lexer->getLine());
  return  &teof;
  }


  state->set_token_present(false);
  state->set_error(false);     /* Start out without an exception */


  {
  ANTLR_MARKER   m;

  m = this->get_istream()->mark();
  state->set_backtracking(1);   /* No exceptions */
  state->set_failedflag(false);

  /* Call the generated lexer, see if it can get a new token together.
   */
  lexer->mTokens();
    state->set_backtracking(0);

   <! mTokens backtracks with synpred at BACKTRACKING==2
    and we set the synpredgate to allow actions at level 1. !>

  if(state->get_failed())
  {
  lexer->rewind(m);
  lexer->consume(); <! advance one char and try again !>
  }
  else
  {
  lexer->emit();     /* Assemble the token and emit it to the stream */
  TokenType& tok = state->get_token();
  return &tok;
  }
  }
  }
}
>>


actionGate() ::= "this->get_backtracking()==0"


filteringActionGate() ::= "this->get_backtracking()==1"


/** How to generate a parser */
genericParser(  grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="ImplTraits::TreeType*") ::= <<
```

```
using namespace antlr3;
<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*        error reporting.
*/
ANTLR_UINT8* <name>TokenNames[<length(tokenNames)>+4]
   = {
     (ANTLR_UINT8*) "\<invalid>",      /* String to print to indicate an invalid token */
     (ANTLR_UINT8*) "\<EOR>",
     (ANTLR_UINT8*) "\<DOWN>",
     (ANTLR_UINT8*) "\<UP>",
     <tokenNames:{it |(ANTLR_UINT8*) <it>}; separator=",\n">
     };
<endif>

  <@members>

  <@end>

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
const char* <name>::getGrammarFileName()
{
 return fileName;
}
/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
<name>::<name>( StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("NULL")>
{
 // See if we can create a new parser with the standard constructor
 //
 this->init(instream<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
```

```
*/
<name>::<name>( StreamType* instream, RecognizerSharedStateType* state<grammar.delegators:{g|,
<g.recognizerName>* <g:delegateName()>}>)
<constructorInitializerType("state")>
{
 this->init(instream <grammar.delegators:{g|, <g:delegateName()>}>);
}

void <name>::init(StreamType* instream<grammar.delegators:{g|, <g.recognizerName>* <g:delegateName()>}>)
{
  <actions.parser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
  /* Create a LIST for recording rule memos.
   */
  typedef RecognizerSharedStateType::RuleMemoType RuleMemoType;
  this->setRuleMemo( new RuleMemoType(15) ); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
<endif>
<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
     {g|m_<g:delegateName()> = new <g.recognizerName>(instream, this->get_psrstate(),
this<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
 <endif>
     <if(grammar.delegators)>
   // Install the pointers back to lexers that will delegate us to perform certain functions
   // for them.
   //
    <grammar.delegators: {g| m_<g:delegateName()> = <g:delegateName()>;}; separator="\n">
 <endif>
 /* Install the token table
 */
 this->get_psrstate()->set_tokenNames( <grammar.composite.rootGrammar.recognizerName>TokenNames );

 <@debugStuff()>

}

void
<name>::reset()
{
  this->get_rec()->reset();
}

/** Free the parser resources
```

```
*/
<name>::~<name>()
{
  <@cleanup>
  <@end>
<if(grammar.directDelegates)>
 // Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
      {g| m_<g:delegateName()>->set_psrstate( NULL );
      delete m_<g:delegateName()>;}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if(this->getRuleMemo() != NULL)
 {
 delete this->getRuleMemo();
 this->setRuleMemo(NULL);
 }
<endif>
<endif>
}

/** Return token names used by this <grammarType()>
 *
 * The returned pointer is used as an index into the token names table (using the token
 * number as the index).
 *
 * \return Pointer to first char * in the table.
 */
static ANTLR_UINT8** getTokenNames()
{
     return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}

   <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(bitsetname={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
          words64=it.bits, traits={<name>ImplTraits} )>}>


<if(cyclicDFAs)>

/* ========================================================================
 * DFA tables for the parser
```

```
*/
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ========================================================================
 * End of DFA tables for the parser
 */
<endif>


/* ================================================
 * Parsing rules
 */
<rules; separator="\n\n">
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 // parser
 //
<grammar.delegatedRules:{ruleDescriptor|
  <returnType()> <name>::<ruleDescriptor.name>(<ruleDescriptor.parameterScope:parameterScope()>)
  {
     <if(ruleDescriptor.hasReturnValue)>return <endif>m_<ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.nam
e>}; separator=", "><endif>);
  \}}; separator="\n">

<endif>
/* End of parsing rules
 * ================================================
 */


/* ================================================
 * Syntactic predicates
 */
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
 * ================================================
 */

>>


constructorInitializerType(rec_state) ::=<<
<if(PARSER)>
  :ImplTraits::BaseParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
<if(TREE_PARSER)>
  :ImplTraits::BaseTreeParserType(ANTLR_SIZE_HINT, instream, <rec_state>)
<endif>
>>


parser( grammar,
```

```
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    bitsets,
    ASTLabelType,
    superClass="Parser",
    labelType="ImplTraits::CommonTokenType*",
    members={<actions.parser.members>}
    ) ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTokenStreamType*", rewriteElementType="Token", filterMode=false,
...)>
<endNamespace(actions)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    globalAction,
    rules,
    numRules,
    bitsets,
    filterMode,
    labelType={<ASTLabelType>},
    ASTLabelType="ImplTraits::TreeType*",
    superClass="TreeParser",
    members={<actions.treeparser.members>}
    ) ::= <<
<beginNamespace(actions)>
<genericParser(inputStreamType="CommonTreeNodeStream*", rewriteElementType="Node", ...)>
<endNamespace(actions)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
```

```
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
void <name>::m<ruleName>_fragment( <ruleDescriptor.parameterScope:parameterScope()> )
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
   ANTLR_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking() );
    <block>
   ANTLR_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n", this->LT(1),failed,this-
>get_backtracking());

<else>
    <block>
<endif>

goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<

bool <name>::msynpred( antlr3::ClassForwarder\< <predname> > )
{
   ANTLR_MARKER   start;
   bool  success;

   this->inc_backtracking();
   <@start()>
   start = this->mark();
   this->m<predname>_fragment();    // can never throw exception
   success = !( this->get_failedflag() );
   this->rewind(start);
   <@stop()>
   this->dec_backtracking();
   this->set_failedflag(false);
   return success;
}<\n>
>>

lexerSynpred(predname) ::= <<
<synpred(predname)>
>>
```

```
ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (this->get_backtracking()>0) && (this->haveParsedRule(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
<endif>
  <(ruleDescriptor.actions.after):execAfter()>
  <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
  <scopeClean()><\n>
<endif>
  return <ruleReturnValue()>;
}
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (this->hasException())
{
  goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (this->hasFailed())
{
  <scopeClean()>
  <@debugClean()>
  return <ruleReturnValue()>;
}
<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (this->get_backtracking()>0)
{
  this->set_failedflag( true );
  <scopeClean()>
  return <ruleReturnValue()>;
}
<endif>
>>

/** How to generate code for a rule.  This includes any return type
```

```
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
* $ANTLR start <ruleName>
* <fileName>:<description>
*/
<returnType()>
<name>::<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
  <if(trace)>ANTLR_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", this->LT(1), this-
>get_backtracking() );<endif>
  <ruleDeclarations()>
  <ruleDescriptor.actions.declarations>
  <ruleLabelDefs()>
  <ruleInitializations()>
  <ruleDescriptor.actions.init>
  <ruleMemoization(rname=ruleName)>
  <ruleLabelInitializations()>

  <if(actions.(actionScope).rulecatch)>
   try {
  <else>
  <if(exceptions)>
    try {
  <endif>
  <endif>
  <@preamble()>
  {
    <block>
  }
  <ruleCleanUp()>

<if(exceptions)>
  <(ruleDescriptor.actions.after):execAfter()>
  <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
  <if(!emptyRule)>
   if (this->hasException())
     {
        this->preporterror();
        this->precover();
        <@setErrorReturnValue()>
     }
     <if(ruleDescriptor.actions.after)>
     else
     {
        <(ruleDescriptor.actions.after):execAfter()>
```

```
      }<\n>
      <endif>
 <if(actions.(actionScope).rulecatch)>
    } <actions.(actionScope).rulecatch>
      <endif>
   <endif>
<endif>

   <if(trace)>ANTLR_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", this->LT(1), failed, this-
>get_backtracking() );<endif>
   <memoize()>
<if(finally)>
   <finalCode(finalBlock=finally)>
<endif>
   <scopeClean()>
   <@postamble()>
   return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
   <finalBlock>
}

>>

catch(decl,action) ::= <<
/* catch(decl,action)
*/
}catch (<e.decl>) {
 <e.action>
}
>>

ruleDeclarations() ::= <<

<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval(this);<\n>
<else>
<if(PARSER)>
   <name>ImplTraits::RuleReturnValueType _antlr_rule_exit(this);
<endif>
<if(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
```

```
<endif>
<endif>
<if(memoize)>
ANTLR_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.returnScope)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)>retval.<a.name> = <a.initValue>;<endif> }>
<else>
<ruleDescriptor.returnScope.attributes:{ a | <if(a.initValue)><a.name> = <a.initValue>;<endif> }>
<endif>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = this->index();<\n>
<endif>
<ruleDescriptor.useScopes:{it | m_<it>_stack.push(<it>Scope()); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.push(<it.name>Scope()); }; separator="\n">
>>

ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it |ImplTraits::TokenPtrsListType list_<it.label.text>;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
>>

ruleLabelInitializations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.call_start_placeholder();
<endif>
<endif>
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<labelType> <it.label.text> = NULL;}; separator="\n"
```

```
>
<ruleDescriptor.charLabels:{it |ANTLR_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it | ImplTraits::IntTrieType<CommonTokenType>* list_<it.label.text>;}; separator="\n"
>
>>


lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it |list_<it.label.text> = new ImplTraits::IntTrieType<CommonTokenType>(31);}; separator="\n"
>
>>


lexerRuleLabelFree() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it | delete list_<it.label.text>;}; separator="\n"
>
>>


ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>


memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if ( this->get_backtracking() > 0 ) { this->memoize(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
```

```
>>

ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.call_stop_placeholder();<\n>
<endif>
<endif>
<endif>
>>

scopeClean() ::= <<
<ruleDescriptor.useScopes:{it | m_<it>_stack.pop(); }; separator="\n">
<ruleDescriptor.ruleScope:{it | m_<it.name>_stack.pop(); }; separator="\n">

>>
/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules, which do not produce tokens.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
 *
 * $ANTLR start <ruleName>
 *
 * Looks to match the characters the constitute the token <ruleName>
 * from the attached input stream.
 *
 *
 * \remark
 *  - lexer->error == true if an exception was thrown.
 */
void <name>::m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
    ANTLR_UINT32 _type;
    <ruleDeclarations()>
    <ruleDescriptor.actions.declarations>
    <lexerRuleLabelDefs()>
    <if(trace)>
    std::cout \<\< "enter <ruleName> '" \<\< (char)this->LA(1)
          \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
          \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking=" \<\< this->get_backtracking() \<\<
```

```
       std::endl;
         <endif>

<if(nakedBlock)>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  <ruleDescriptor.actions.init>

  <block><\n>
<else>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  _type    = <ruleName>;

  <ruleDescriptor.actions.init>

  <block>
 this->get_lexstate()->set_type(_type);
<endif>
  <if(trace)>
  std::cout \<\< "exit <ruleName> '" \<\< (char)this->LA(1)
        \<\< "' line=" \<\< this->getLine() \<\< ":" \<\< this->getCharPositionInLine()
        \<\< " failed=" \<\< this->get_failedflag() \<\< " backtracking=" \<\< this->get_backtracking() \<\<
std::endl;
  <endif>
  <ruleCleanUp()>
  <lexerRuleLabelFree()>
  <(ruleDescriptor.actions.after):execAfter()>
  <memoize>
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
 *  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
 */
void
<name>::mTokens()
{
  <block><\n>

  goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
```

```
>>

// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
  int alt<decisionNumber>=<maxAlt>;
  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  <@prebranch()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
  }
  <@postbranch()>
}
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
  //  <fileName>:<description>

  ANTLR_UINT32 alt<decisionNumber>;

  alt<decisionNumber>=<maxAlt>;

  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
  }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
```

```
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
{
  int cnt<decisionNumber>=0;
  <decls>
  <@preloop()>

  for (;;)
  {
     int alt<decisionNumber>=<maxAlt>;
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>)
{
   <alts:{a | <altSwitchCase(i,a)>}>
   default:

 if ( cnt<decisionNumber> >= 1 )
 {
    goto loop<decisionNumber>;
 }
 <ruleBacktrackFailure()>
 <earlyExitEx()>
 <@earlyExitException()>
 goto rule<ruleDescriptor.name>Ex;
 }
 cnt<decisionNumber>++;
  }
  loop<decisionNumber>: ; /* Jump to here if this rule does not match */
  <@postloop()>
}
>>
```

```
earlyExitEx() ::= <<
/* mismatchedSetEx()
*/
new ANTLR_Exception\< <name>ImplTraits, EARLY_EXIT_EXCEPTION, StreamType>( this->get_rec(), "" );
<\n>
>>
```

positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<

```
// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
  int alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
default:
    goto loop<decisionNumber>; /* break out of the loop */
    break;
  }
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>
```

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by antlr before code generation
 * so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
 * number. A DFA predicts the alternative and then a simple switch
 * does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum,alt) ::= <<
```

```
case <altNum>:
  <@prealt()>
  <alt>
  break;<\n>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
  <@declarations()>
  <@initializations()>
  <elements:element()>
  <rew>
  <@cleanup()>
}
>>


// E L E M E N T S
/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""


/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>


/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = <endif> this->matchToken(<token>, &FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>


/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


listLabel(label,elem) ::= <<
list_<label>.push_back(<elem>);
>>


/** match a character */
```

```
charRef(char,label) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchc(<char>);
<checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchRange(<a>, <b>);
<checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= this->LA(1);<\n>
<else>
<label>=(<labelType>) this->LT(1);<\n>
<endif>
<endif>
if ( <s> )
{
  this->consume();
  <postmatchCode>
<if(!LEXER)>
  this->set_perror_recovery(false);
<endif>
  <if(backtracking)> this->set_failedflag(false); <\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  this->recover();
<else>
<! use following code to make it recover inline;
  this->recoverFromMismatchedSet(&FOLLOW_set_in_<ruleName><elementIndex>);
!>
<endif>
  goto rule<ruleDescriptor.name>Ex;
```

```
}<\n>
>>


mismatchedSetEx() ::= <<
new ANTLR_Exception\< <name>ImplTraits, MISMATCHED_SET_EXCEPTION, StreamType>( this->get_rec(),
"" );
<if(PARSER)>
this->get_exception()->set_expectingSet(NULL);
<! use following code to make it recover inline;
this->get_exception()->set_expectingSet( &FOLLOW_set_in_<ruleName><elementIndex> );
!>
<endif>
>>


matchRuleBlockSet ::= matchSet


matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
ANTLR_MARKER <label>Start = this->getCharIndex();
ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
this->matchs(<string>);
<checkRuleBacktrackFailure()>
<label> = new CommonTokenType;
<label>->set_type( CommonTokenType::TOKEN_INVALID );
<label>->set_startIndex( <label>Start);
<label>->set_stopIndex( this->getCharIndex()-1);
<label>->set_input( this->get_input() );
<label>->set_line( <label>StartLine<elementIndex> );
<label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
<else>
this->matchs(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)this->LT(1);<\n>
<endif>
this->matchAnyToken();
<checkRuleBacktrackFailure()>
```

```
>>

wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = this->LA(1);<\n>
<endif>
this->matchAny();
<checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values. The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
this->followPush(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>m_<scope:delegateName()>-><endif><rule.name>(<if(args)><args;
separator=", "><endif>);<\n>
this->followPop();
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>


/** A lexer rule reference
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
```

```
<if(label)>
{
  ANTLR_MARKER <label>Start<elementIndex> = this->getCharIndex();
  ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
  ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
  <if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<if(scope)>m_<scope:delegateName()><endif>
<if(args)>, <endif><args; separator=", ">);
  <checkRuleBacktrackFailure()>
  <label> = new CommonTokenType();
  <label>->set_type( CommonTokenType::TOKEN_INVALID);
  <label>->set_startIndex( <label>Start<elementIndex> );
  <label>->set_stopIndex( this->getCharIndex()-1 );
  <label>->set_input( this->get_input() );
  <label>->set_line( <label>StartLine<elementIndex> );
  <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
<if(scope)>m_<scope:delegateName()>-><endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR_UINT32 <label>Start<elementIndex>;
  ANTLR_UINT32 <label>StartLine<elementIndex> = this->getLine();
  ANTLR_UINT32 <label>StartCharPos<elementIndex> = this->getCharPositionInLine();
  <labelType> <label>;
  <label>Start<elementIndex> = this->getCharIndex();
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = new CommonTokenType();
  <label>->set_type( CommonTokenType::TOKEN_EOF );
  <label>->set_startIndex(<label>Start<elementIndex>);
  <label>->set_stopIndex(this->getCharIndex()-1);
  <label>->set_input( this->get_input() );
  <label>->set_line( <label>StartLine<elementIndex> );
  <label>->set_charPositionInLine( <label>StartCharPos<elementIndex> );
}
<else>
```

```
  this->matchc(ANTLR_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <endif>
>>


// used for left-recursive rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                    ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()           ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)     ::= "$<name>=$<src>.<name>;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( this->LA(1)== CommonTokenType::TOKEN_DOWN ) {
  this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
  <checkRuleBacktrackFailure()>
  <children:element()>
  this->matchToken(CommonTokenType::TOKEN_UP, NULL);
  <checkRuleBacktrackFailure()>
}
<else>
this->matchToken(CommonTokenType::TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
this->matchToken(CommonTokenType::TOKEN_UP, NULL);
<checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) )
{
  <ruleBacktrackFailure()>
  <newFPE(...)>
}
>>


newFPE() ::= <<
 ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, FAILED_PREDICATE_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
  ex->set_ruleName( "<ruleName>" );
```

```
  <\n>
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
  int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
  <edges; separator="\nelse ">
  else
  {
<if(eotPredictsAlt)>
    alt<decisionNumber>=<eotPredictsAlt>;
<else>
    <ruleBacktrackFailure()>

    <newNVException()>
    goto rule<ruleDescriptor.name>Ex;

<endif>
  }
}
>>


newNVException() ::= <<
ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( this->get_rec(), "<description>" );
ex->set_decisionNum( <decisionNumber> );
ex->set_state( <stateNumber> );
<@noViableAltException()>
<\n>
>>


/** Same as a normal DFA state except that we don't examine lookahead
 * for the bypass alternative.  It delays error detection but this
 * is faster, smaller, and more what people expect. For (X)? people
 * expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
  <edges; separator="\nelse ">
}
>>


/** A DFA state that is actually the loopback decision of a closure
 * loop. If end-of-token (EOT) predicts any of the targets then it
```

```
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */

dfaLoopbackStateDecls()::= <<
ANTLR_UINT32  LA<decisionNumber>_<stateNumber>;
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
   */
   int LA<decisionNumber>_<stateNumber> = this->LA(<k>);
   <edges; separator="\nelse "><\n>
   <if(eotPredictsAlt)>
   <if(!edges)>
 alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
 <else>
   else
   {
 alt<decisionNumber>=<eotPredictsAlt>;
   }<\n>
   <endif>
   <endif>
}
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
 * enter to the target state.  To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( (<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
  <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 * decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
```

```
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
   <ruleBacktrackFailure()>
   <newNVException()>
   goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
   <edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( this->LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
   alt<decisionNumber>=<eotPredictsAlt>;
   break;<\n>
<endif>
}<\n>
>>

dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
   break;
>>

// C y c l i c   D F A

/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
```

```
alt<decisionNumber> = cdfa<decisionNumber>.predict(this, this->get_rec(), this->get_istream(),
cdfa<decisionNumber> );
<checkRuleBacktrackFailure()>
>>


/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
 * which are then used to statically initialize the dfa structure, which means that there
 * is no runtime initialization whatsoever, other than anything the C compiler might
 * need to generate. In general the C compiler will lay out memory such that there is no
 * runtime code required.
 */
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
 *    <dfa.description>
 */
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {
 <dfa.eot; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
   {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {
 <dfa.min; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {
 <dfa.max; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {
 <dfa.special; wrap="\n", separator=", ", null="-1">
   };

/** Used when there is no transition table entry for a particular state */
static const ANTLR_INT32* dfa<dfa.decisionNumber>_T_empty  =   NULL;

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
   {
 <table; separator=", ", wrap="\n", null="-1">
   \};<\n>}; null = "">
```

```
/* Transition tables are a table of sub tables, with some tables
 * reused for efficiency.
 */
static const ANTLR_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
  <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="NULL">
};

<@errorMethod()>

/* Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
 */
class <name>CyclicDFA<dfa.decisionNumber> : public CyclicDFA\< <name>ImplTraits, <name> >, public
<name>Tokens
{
public:
 typedef CyclicDFA\< <name>ImplTraits, <name> >  BaseType;
 typedef BaseType::ContextType CtxType;

private:
<if(dfa.specialStateSTs)>
 //to maintain C-Target compatibility, we need to make some of ctx functions look like member funcs
 CtxType* m_ctx;
<endif>

public:
 <name>CyclicDFA<dfa.decisionNumber>( ANTLR_INT32 decisionNumber
    , const ANTLR_UCHAR* description
    , const ANTLR_INT32* const eot
    , const ANTLR_INT32* const eof
    , const ANTLR_INT32* const min
    , const ANTLR_INT32* const max
    , const ANTLR_INT32* const accept
    , const ANTLR_INT32* const special
    , const ANTLR_INT32* const *const transition)
    :BaseType( decisionNumber, description, eot, eof, min, max, accept,
       special, transition )
 {
<if(dfa.specialStateSTs)>
 m_ctx = NULL;
<endif>
 }

  <if(dfa.specialStateSTs)>
  ANTLR_UINT32 LA(ANTLR_INT32 i)
  {
     return m_ctx->LA(i);
```

```
      }

      <if(PARSER)>
      const CtxType::CommonTokenType*  LT(ANTLR_INT32 k)
      {
         return m_ctx->LT(k);
      }
      <endif>
      <if(synpreds)>
      template\<typename PredType>
      bool msynpred( PredType pred )
      {
         return m_ctx->msynpred(pred);
      }
      <endif>


  ANTLR_INT32  specialStateTransition(CtxType * ctx, RecognizerType* recognizer, IntStreamType* is,
  ANTLR_INT32 s)
  {
      ANTLR_INT32    _s;

      m_ctx = ctx;
      _s    = s;
      switch  (s)
      {
      <dfa.specialStateSTs:{state |
      case <i0>:

  <state>}; separator="\n">
      }
<if(backtracking)>
      if ( ctx->get_backtracking() > 0)
      {
   ctx->set_failedflag( true );
  return -1;
      }
<endif>
      ExceptionBaseType* ex = new ANTLR_Exception\< <name>ImplTraits, NO_VIABLE_ALT_EXCEPTION,
StreamType>( recognizer, "<dfa.description>" );
      ex->set_decisionNum( <dfa.decisionNumber> );
      ex->set_state(_s);
      <@noViableAltException()>
      return -1;
  }
 <endif>
 };

static <name>CyclicDFA<dfa.decisionNumber> cdfa<dfa.decisionNumber>(
```

```
      <dfa.decisionNumber>,    /* Decision number of this dfa    */
      /* Which decision this represents:   */
      (const ANTLR_UCHAR*)"<dfa.description>",
      dfa<dfa.decisionNumber>_eot,    /* EOT table      */
      dfa<dfa.decisionNumber>_eof,    /* EOF table      */
      dfa<dfa.decisionNumber>_min,    /* Minimum tokens for each state    */
      dfa<dfa.decisionNumber>_max,    /* Maximum tokens for each state    */
      dfa<dfa.decisionNumber>_accept, /* Accept table     */
      dfa<dfa.decisionNumber>_special, /* Special transition states    */
      dfa<dfa.decisionNumber>_transitions /* Table of transition tables    */

 );


/* End of Cyclic DFA <dfa.decisionNumber>
 * ---------------------
 */
>>

/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
   ANTLR_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
   ANTLR_MARKER index<decisionNumber>_<stateNumber>;<\n>

   LA<decisionNumber>_<stateNumber> = ctx->LA(1);<\n>
   <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
   index<decisionNumber>_<stateNumber> = ctx->index();<\n>
   ctx->rewindLast();<\n>
   <endif>
   s = -1;
   <edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
ctx->seek(index<decisionNumber>_<stateNumber>);<\n>
<endif>
   if ( s>=0 )
    {
return s;
    }
}
break;
>>

/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
```

```
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ( (<labelExpr>) <if(predicates)>&& (<predicates>)<endif> )
{
  s = <targetStateNumber>;
}<\n>
>>
```

```
/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>
```

// D F A   E X P R E S S I O N S

```
andPredicates(left,right) ::= "( (<left>) && (<right>) )"
```

```
orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"
```

```
notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"
```

```
evalPredicate(pred,description) ::= "(<pred>)"
```

```
evalSynPredicate(pred,description) ::= "this->msynpred( antlr3::ClassForwarder\<<pred>>() )"
```

```
lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"
```

```
/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 *  somewhere.  Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "this->LA(<k>) == <atom>"
```

```
lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>
```

```
isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((this->LA(<k>) >=
<lower>) && (this->LA(<k>) \<= <upper>))"
```

```
setTest(ranges) ::= "<ranges; separator=\" || \">"
```

// A T T R I B U T E S

```
makeScopeSet() ::= <<
/* makeScopeSet()
 */
```

```
/** Definition of the <scope.name> scope variable tracking
 *  structure. An instance of this structure is created by calling
 *  <name>_<scope.name>Push().
 */
struct  <scopeStruct(sname=scope.name,...)>
{
  /* ============================================================================
   * Programmer defined variables...
   */
  <scope.attributes:{it |<it.decl>;}; separator="\n">

  /* End of programmer defined variables
   * ============================================================================
   */
};

>>

globalAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeDef(scope) ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>

StackType\< <scopeStruct(sname=scope.name)> > <scopeStack(sname=scope.name)>;

<endif>
>>

ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
```

```
*/
StackType\< <scopeStruct(sname=scope.name)> > <scopeStack(sname=scope.name,...)>;

<endif>
>>

scopeStruct(sname) ::= <<
<sname>Scope
>>

scopeStack(sname) ::= <<
m_<sname>_stack
>>

returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>::<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
bool
<endif>
%>

/** Generate the C type associated with a single or multiple return
 *  value(s).
 */
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
```

```
<if(d.label)><d.label><else>g<d.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "0".
 */
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>

/** Define a rule label  */
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
>>
/**  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>

ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>ImplTraits::TreeType*<endif>"

/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
struct <ruleDescriptor:returnStructName()> : public <name>ImplTraits::RuleReturnValueType
{
public:
  typedef <name>ImplTraits::RuleReturnValueType BaseType;
  <ruleDescriptor:returnStructName()>()
    : BaseType()
    <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
    { init(); }
  <ruleDescriptor:returnStructName()>( BaseParserType* parser )
    : BaseType(parser)
    <if(scope)>, <scope.attributes:{it | <it.name>() }; separator=","><endif>
    { init(); }
  <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
    : BaseType(other)
  <if(scope)>, <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=", "><endif>
  { copy(other); }
  ~<ruleDescriptor:returnStructName()>()
  {
      <@ruleReturnMembersDelete()>
```

```
    }

  <ruleDescriptor:returnStructName()>&
  operator=( const <ruleDescriptor:returnStructName()>& other )
  {
    BaseType::operator=( other );
    <if(scope)><scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n"><endif>
    copy(other);
   return *this;
  }
  <@ruleReturnMembers()>
  void init() { <@ruleReturnMembersInit()> }
  void copy( const <ruleDescriptor:returnStructName()>& other) { <@ruleReturnMembersCopy()> }
<else>
struct <ruleDescriptor:returnStructName()>
{
public:
  <name>ImplTraits::<recognizer.ASTLabelType>      start;
  <name>ImplTraits::<recognizer.ASTLabelType>      stop;
  <ruleDescriptor:returnStructName()>( const <ruleDescriptor:returnStructName()>& other )
  <if(scope.attributes)>
  <scope.attributes:{it | <it.name>(other.<it.name>) }; separator=",">
  <endif>
  {
   start = other.start;
   stop  = other.stop;
  }

  <ruleDescriptor:returnStructName()>&
  operator=( const <ruleDescriptor:returnStructName()>& other )
  {
   start = other.start;
   stop  = other.stop;

  <scope.attributes:{it | <it.name> = other.<it.name>; }; separator="\n">
  return *this;
  }
<endif>
  <if(scope)><scope.attributes:{it |<it.type> <it.name>;}; separator="\n"><endif>
};

<endif>
<endif>
>>

parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>
```

```
parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"


/** Note that the scopeAttributeRef does not have access to the
 * grammar name directly
 */
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name>
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name>
<else>
 m_<scope>_stack.peek().<attr.name>
<endif>
<endif>
%>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
 m_<scope>_stack.at( m_<scope>_stack.size()-<negIndex>-1).<attr.name> = <expr>;
<else>
<if(index)>
 m_<scope>_stack.at(<index>).<attr.name> = <expr>;
<else>
 m_<scope>_stack.peek().<attr.name> =<expr>;
<endif>
<endif>
%>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"


/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>


returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
```

```
retval.<attr.name>
<else>
<attr.name>
<endif>
>>

returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach
//
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->get_tree())"
tokenLabelPropertyRef_int(scope,attr) ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(this->get_strstream()->toStringSS(<scope>.start, <scope>.start))
<else>
(this->get_strstream()->toStringTT(<scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"
```

```
lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->get_type())"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->get_line())"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->get_charPositionInLine())"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->get_channel())"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->get_tokenIndex())"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText())"


// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
this->get_input()->toStringSS( this->get_adaptor()->getTokenStartIndex(retval.start), this->get_adaptor()-
>getTokenStopIndex(retval.start))
<else>
this->get_strstream()->toStringTT(retval.start, this->LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"


lexerRulePropertyRef_text(scope,attr) ::= "this->getText()"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "this->get_state()->get_tokenStartLine()"
lexerRulePropertyRef_pos(scope,attr) ::= "this->get_state()->get_tokenStartCharPositionInLine()"
lexerRulePropertyRef_channel(scope,attr) ::= "this->get_state()->get_channel()"
lexerRulePropertyRef_start(scope,attr) ::= "this->get_state()->get_tokenStartCharIndex()"
lexerRulePropertyRef_stop(scope,attr) ::= "(this->getCharIndex()-1)"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr) ::= "(<name>ImplTraits::ConvertToInt32(<scope>->getText()))"


// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"


/** How to deal with an @after for C targets. Because we cannot rely on
 *  any garbage collection, after code is executed even in backtracking
 *  mode. Must be documented clearly.
 */
execAfter(action) ::= <<
{
  <action>
}
>>

/** How to execute an action (when not backtracking) */
```

```
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if ( <actions.(actionScope).synpredgate> )
{
  <action>
}
<else>
if ( BACKTRACKING == 0 )
{
  <action>
}
<endif>
<else>
{
  <action>
}
<endif>
>>

// M I S C (properties, etc...)

bitsetDeclare(bitsetname, words64, traits) ::= <<

/** Bitset defining follow set for error recovery in rule state: <name>  */
static ANTLR_BITWORD <bitsetname>_bits[] = { <words64:{it |ANTLR_UINT64_LIT(<it>)}; separator=", "> };
static  <traits>::BitsetListType <bitsetname>( <bitsetname>_bits, <length(words64)> );
>>

codeFileExtension() ::= ".cpp"

true_value() ::= "true"
false_value() ::= "false"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Cpp/Cpp.stg
No license file was found, but licenses were detected in source scan.

```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 * hierarchy is set up as ASTDbg : AST : Dbg : Java by code generator.
 */

parserMembers() ::= <<
 protected DebugTreeAdaptor adaptor;
 public void setTreeAdaptor(TreeAdaptor adaptor) {
<if(grammar.grammarIsRoot)>
  this.adaptor = new DebugTreeAdaptor(dbg,adaptor);
<else>
  this.adaptor = (DebugTreeAdaptor)adaptor; // delegator sends dbg adaptor
<endif>
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
 }
 public TreeAdaptor getTreeAdaptor() {
  return adaptor;
 }
>>

parserCtorBody() ::= <<
<super.parserCtorBody()>
>>

createListenerAndHandshake() ::= <<
DebugEventSocketProxy proxy =
 new DebugEventSocketProxy(this,port,<if(TREE_PARSER)>input.getTreeAdaptor()<else>adaptor<endif>);
setDebugListener(proxy);
set<inputStreamType>(new Debug<inputStreamType>(input,proxy));
try {
 proxy.handshake();
```

```
}
catch (IOException ioe) {
 reportError(ioe);
}
>>


@ctorForRootGrammar.finally() ::= <<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
proxy.setTreeAdaptor(adap);
>>


@ctorForProfilingRootGrammar.finally() ::=<<
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
>>


@ctorForPredefinedListener.superClassRef() ::= "super(input, dbg);"

@ctorForPredefinedListener.finally() ::=<<
<if(grammar.grammarIsRoot)> <! don't create new adaptor for delegates !>
TreeAdaptor adap = new CommonTreeAdaptor();
setTreeAdaptor(adap);
<endif>
>>


@rewriteElement.pregen() ::= "dbg.location(<e.line>,<e.pos>);"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ASTDbg.stg
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```
/** Template overrides to add debugging to AST stuff.  Dynamic inheritance
 *  hierarchy is set up as ASTDbg : AST : Dbg : Python by code generator.
 */
group ASTDbg;

astAccessor() ::= <<
def setTreeAdaptor(self, adaptor):
<if(grammar.grammarIsRoot)>
  self._adaptor = DebugTreeAdaptor(self.dbg, adaptor)
<else>
  self._adaptor = adaptor # delegator sends dbg adaptor
<endif>
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(self._adaptor)}>

def getTreeAdaptor(self):
  return self._adaptor

adaptor = property(getTreeAdaptor, setTreeAdaptor)<\n>
>>

createListenerAndHandshake() ::= <<
proxy = DebugEventSocketProxy(self,
adaptor=<if(TREE_PARSER)>self.input.getTreeAdaptor()<else>self._adaptor<endif>,
                 debug=debug_socket, port=port)
self.setDebugListener(proxy)
self.adaptor.setDebugListener(proxy)
self.input.setDebugListener(proxy)
#self.set<inputStreamType>(Debug<inputStreamType>(self.input, proxy))
proxy.handshake()
>>

@rewriteElement.pregen() ::= "self._dbg.location(<e.line>, <e.pos>)"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-

jar/org/antlr/codegen/templates/Python/ASTDbg.stg

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```
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*/

@outputFile.imports() ::= <<
<@super.imports()>
<if(!TREE_PARSER)><! tree parser would already have imported !>
import org.antlr.runtime.tree.*;<\n>
<endif>
>>

@genericParser.members() ::= <<
<@super.members()>
 <parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
protected TreeAdaptor adaptor = new CommonTreeAdaptor();

public void setTreeAdaptor(TreeAdaptor adaptor) {
```

```
 this.adaptor = adaptor;
 <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
}
public TreeAdaptor getTreeAdaptor() {
 return adaptor;
}
>>

@returnScope.ruleReturnMembers() ::= <<
<ASTLabelType> tree;
@Override
public <ASTLabelType> getTree() { return tree; }
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0 = null;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<if(!ruleDescriptor.isSynPred)>
<[ruleDescriptor.tokenLabels,ruleDescriptor.wildcardTreeLabels,
 ruleDescriptor.wildcardTreeListLabels]:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree=null;}; separator="\n">
<if(ruleDescriptor.supportsLabelOptimization)>
<ruleDescriptor.allTokenRefsInRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInRewrites
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
<else>
<ruleDescriptor.allTokenRefsInAltsWithRewrites
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>");}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule <it>");};
separator="\n">
<endif>
<endif>
>>

/** When doing auto AST construction, we must define some variables;
 * These should be turned off if doing rewrites.  This must be a "mode"
 * as a rule could have both rewrite and AST within the same alternative
 * block.
```

```
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode && !ruleDescriptor.isSynPred)>
root_0 = (<ASTLabelType>)adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>
```

// T r a c k i n g   R u l e   E l e m e n t s

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
 *  to the tracking list stream_ID for use in the rewrite.
 */
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label, ...)>
>>
```

```
/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>
```

```
/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label, ...)>
>>
```

```
/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>
```

```
/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
```

```
<listLabel(label, {<label>.getTree()})>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(label, {<label>.getTree()})>
>>

// R e w r i t e

rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
 referencedWildcardLabels,
 referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
// wildcard labels: <[referencedWildcardLabels,referencedWildcardListLabels]; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = (<ASTLabelType>)adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
input.replaceChildren(adaptor.getParent(retval.start),
```

```
            adaptor.getChildIndex(retval.start),
            adaptor.getChildIndex(_last),
            retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>


rewriteCodeLabels() ::= <<
<referencedTokenLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>",<it>);};
 separator="\n"
>
<referencedTokenListLabels
 :{it | RewriteRule<rewriteElementType>Stream stream_<it>=new
RewriteRule<rewriteElementType>Stream(adaptor,"token <it>", list_<it>);};
 separator="\n"
>
<referencedWildcardLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",<it>);};
 separator="\n"
>
<referencedWildcardListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"wildcard <it>",list_<it>);};
 separator="\n"
>
<referencedRuleLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"rule
<it>",<it>!=null?<it>.getTree():null);};
 separator="\n"
>
<referencedRuleListLabels
 :{it | RewriteRuleSubtreeStream stream_<it>=new RewriteRuleSubtreeStream(adaptor,"token <it>",list_<it>);};
 separator="\n"
>
>>
```

```
/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
 throw new RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
 <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
```

```
 <a.alt>
}<\n>
<else>
{
 <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,args,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>
```

```
/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,args,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createRewriteNodeFromElement(...)>,
root_<treeLevel>);
>>

rewriteImaginaryTokenRef(args,token,elementIndex,terminalOptions={}) ::= <<
adaptor.addChild(root_<treeLevel>, <createImaginaryNode(token,args,terminalOptions)>);
>>

rewriteImaginaryTokenRefRoot(args,token,elementIndex,terminalOptions={}) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<createImaginaryNode(token,args,terminalOptions)>,
root_<treeLevel>);
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;
>>

/** What is the name of the previous value of this rule's root tree?  This
 * let's us refer to $rule to mean previous value.  I am reusing the
 * variable 'tree' sitting in retval struct to hold the value of root_0 right
 * before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);
>>

rewriteNodeAction(action) ::= <<
adaptor.addChild(root_<treeLevel>, <action>);
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<action>, root_<treeLevel>);
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
```

```
rewriteRuleLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>


/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>


/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>


/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);
>>


rewriteWildcardLabelRef(label) ::= <<
adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());
>>



createImaginaryNode(tokenType,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
(<ASTLabelType>)adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
%>


createRewriteNodeFromElement(token,args,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
%>


Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/AST.stg
```

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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
 *  If debugging, then you'll also get STDbg.stg loaded.
 */

@outputFile.imports() ::= <<
<@super.imports()>
import stringtemplate3
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnInit() ::= <<
self.st = None
>>

@returnScope.ruleReturnMembers() ::= <<
def getTemplate(self):
    return self.st

def toString(self):
```

```
  if self.st is not None:
     return self.st.toString()
  return None
__str__ = toString


>>


@genericParser.init() ::= <<
<@super.init()>
self.templateLib = stringtemplate3.StringTemplateGroup(
  '<name>Templates', lexer='angle-bracket'
  )


>>


@genericParser.members() ::= <<
<@super.members()>
def setTemplateLib(self, templateLib):
  self.templateLib = templateLib

def getTemplateLib(self):
  return self.templateLib


>>


/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.st})>
>>


rewriteTemplate(alts) ::= <<
# TEMPLATE REWRITE
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <first(alts):rewriteTemplateAltFirst()>
  <rest(alts):{it | el<rewriteTemplateAlt(it)>}>
  <if(rewriteMode)><replaceTextInLine()><endif>

<else>
<first(alts):rewriteTemplateAltFirst()>
<rest(alts):{it | el<rewriteTemplateAlt(it)>}>
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>


replaceTextInLine() ::= <<
<if(TREE_PARSER)>
```

```
self.input.getTokenStream().replace(
  self.input.getTreeAdaptor().getTokenStartIndex(retval.start),
  self.input.getTreeAdaptor().getTokenStopIndex(retval.start),
  retval.st
  )
<else>
self.input.replace(
  retval.start.getTokenIndex(),
  self.input.LT(-1).getTokenIndex(),
  retval.st
  )
<endif>
>>


rewriteTemplateAltFirst(alt) ::= <<
<if(alt.pred)>
if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>
# <alt.description>
retval.st = <alt.alt>
<\n>
<endif>
>>


rewriteTemplateAlt(alt) ::= <<
<if(alt.pred)>if <alt.pred>:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<else>se:
  # <alt.description>
  retval.st = <alt.alt>
<\n>
<endif>
>>


rewriteEmptyTemplate(alts) ::= <<
None
>>


/** Invoke a template with a set of attribute name/value pairs.
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
```

```
*/
rewriteExternalTemplate(name,args) ::= <%
self.templateLib.getInstanceOf("<name>"<if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
self.templateLib.getInstanceOf(<expr><if(args)>, attributes={<args:{a | "<a.name>": <a.value>}; separator=",
">}<endif>)
%>


/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
stringtemplate3.StringTemplate("<template>", group=self.templateLib<if(args)>, attributes={<args:{a |
"<a.name>": <a.value>}; separator=", ">}<endif>)
%>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>)["<attrName>"] = <expr>
>>


/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
stringtemplate3.StringTemplate(<stringExpr>, group=self.templateLib)
>>
```

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* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
 * If debugging, then you'll also get STDbg.stg loaded.
 */

@outputFile.imports() ::= <<
<@super.imports()>
import org.antlr.stringtemplate.*;
import org.antlr.stringtemplate.language.*;
import java.util.HashMap;
>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
public StringTemplate st;
public Object getTemplate() { return st; }
public String toString() { return st==null?null:st.toString(); }
>>

@genericParser.members() ::= <<
<@super.members()>
 protected StringTemplateGroup templateLib =
   new StringTemplateGroup("<name>Templates", AngleBracketTemplateLexer.class);

 public void setTemplateLib(StringTemplateGroup templateLib) {
  this.templateLib = templateLib;
 }
 public StringTemplateGroup getTemplateLib() {
  return templateLib;
 }
 /** allows convenient multi-value initialization:
  * "new STAttrMap().put(...).put(...)"
```

```
 */
@SuppressWarnings("serial")
public static class STAttrMap extends HashMap\<String, Object> {
 public STAttrMap put(String attrName, Object value) {
  super.put(attrName, value);
  return this;
 }
 }
>>


/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, {<label>.getTemplate()})>
>>


rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>


replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.getTokenStream()).replace(
 input.getTreeAdaptor().getTokenStartIndex(retval.start),
 input.getTreeAdaptor().getTokenStopIndex(retval.start),
 retval.st);
<else>
((TokenRewriteStream)input).replace(
 ((Token)retval.start).getTokenIndex(),
 input.LT(-1).getTokenIndex(),
 retval.st);
<endif>
>>


rewriteTemplateAlt(alt) ::= <<
// <alt.description>
<if(alt.pred)>
if (<alt.pred>) {
```

```
 retval.st = <alt.alt>;
}<\n>
<else>
{
 retval.st = <alt.alt>;
}<\n>
<endif>
>>


rewriteEmptyTemplate(alts) ::= <<
null;
>>


/** Invoke a template with a set of attribute name/value pairs.
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
 */
rewriteExternalTemplate(name,args) ::= <%
templateLib.getInstanceOf("<name>"<if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
templateLib.getInstanceOf(<expr><if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>


/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
new StringTemplate(templateLib, "<template>"<if(args)>,
 new STAttrMap()<args:{a | .put("<a.name>", <a.value>)}>
 <endif>)
%>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).setAttribute("<attrName>",<expr>);
>>
```

```
/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(templateLib,<stringExpr>)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Java/ST.stg
No license file was found, but licenses were detected in source scan.

```
/** Templates for building ASTs during tree parsing.
 *
 * Deal with many combinations.  Dimensions are:
 * Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 * Each combination has its own template except that label/no label
 * is combined into tokenRef, ruleRef, ...
```

```
*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var _first_0:<ASTLabelType> = null;
var _last:<ASTLabelType> = null;<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(rewriteMode)>
retval.tree = <ASTLabelType>(_first_0);
if ( adaptor.getParent(retval.tree)!=null && adaptor.isNil( adaptor.getParent(retval.tree) ) )
  retval.tree = <ASTLabelType>(adaptor.getParent(retval.tree));
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = <ASTLabelType>(input.LT(1));
{
var _save_last_<treeLevel>:<ASTLabelType> = _last;
var _first_<treeLevel>:<ASTLabelType> = null;
<if(!rewriteMode)>
var root_<treeLevel>:<ASTLabelType> = <ASTLabelType>(adaptor.nil());
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==TokenConstants.DOWN ) {
  matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
```

```
    matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
}
<else>
matchStream(input, TokenConstants.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
matchStream(input, TokenConstants.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
>>


/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>
```

```
/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.dupTree(<label>);
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>


// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
```

```
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>


matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.matchSet(...)>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = <ASTLabelType>(adaptor.dupNode(<label>));
<endif><\n>
root_<treeLevel> = <ASTLabelType>(adaptor.becomeRoot(<label>_tree, root_<treeLevel>));
<if(backtracking)>}<endif>
<endif>
}, ...
)>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.tree);
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>
```

```
/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>root_<treeLevel> =
<ASTLabelType>(adaptor.becomeRoot(<label>.tree, root_<treeLevel>));
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrack(...)>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefTrackAndListLabel(...)>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRootTrack(...)>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = <ASTLabelType>(input.LT(1));
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>


/** Streams for token refs are tree nodes now; override to
```

```
*  change nextToken to nextNode.
*/
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<\n><endif>
retval.tree = <ASTLabelType>(adaptor.rulePostProcessing(root_0));
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/ActionScript/ASTTreeParser.stg
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*/

```
/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations.  Dimensions are:
* Auto build or rewrite
*   no label, label, list label  (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
*/
group ASTTreeParser;

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_First[0] := nil;
_Last := nil;<\n>
>>

ruleDeclarationVars() ::= <<
<super.ruleDeclarationVars()>
_First, _Save_Last: array [0..63] of I<ASTLabelType>;
_Last: I<ASTLabelType>;
>>

/** What to emit when there is no rewrite rule.  For auto build
* mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if (State.Backtracking = 0) then
begin<endif>
<if(rewriteMode)>
RetVal.Tree := _First[0] as I<ASTLabelType>;
if (Adaptor.GetParent(RetVal.Tree) \<\> nil) and (Adaptor.IsNil(Adaptor.GetParent(RetVal.Tree))) then
 RetVal.Tree := Adaptor.GetParent(RetVal.Tree) as I<ASTLabelType>;
<endif>
<if(backtracking)>end;<endif>
>>

/** match ^(root children) in tree parser; override here to
```

```
*  add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
begin
 _Save_Last[<treeLevel>] := _Last;
 _First[<treeLevel>] := nil;
<if(!rewriteMode)>
 Root[<treeLevel>] := Adaptor.GetNilNode as I<ASTLabelType>;<\n>
<endif>
 <root:element()>
<if(rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(root.el.rule)>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>.Tree;
<else>
 if (_First[<enclosingTreeLevel>] = nil) then _First[<enclosingTreeLevel>] := <root.el.label>;
<endif>
<endif>
 <actionsAfterRoot:element()>
<if(nullableChildList)>
 if (Input.LA(1) = TToken.DOWN) then
 begin
   Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
   <children:element()>
   Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
 end;
<else>
 Match(Input, TToken.DOWN, nil); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(Input, TToken.UP, nil); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
 Adaptor.AddChild(Root[<enclosingTreeLevel>], Root[<treeLevel>]);
<endif>
 _Last := _Save_Last[<treeLevel>];
end;<\n>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
```

```
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>
end;
<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>;
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin
<endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
 <label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
 Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree, Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>
```

```
end;
<endif>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_Llast := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
<endif><\n>
Adaptor.AddChild(Root[<treeLevel>], <label>_tree);
<if(backtracking)>end;<endif>
<endif>
}
)>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>


matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.matchSet(...)>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then begin <endif>
<if(terminalOptions.node)>
<label>_tree := T<terminalOptions.node>.Create(<label>);
<else>
<label>_tree := Adaptor.DupNode(<label>) as I<ASTLabelType>;
```

```
<endif><\n>
Root[<treeLevel>] := Adaptor.BecomeRoot(<label>_tree, Root[<treeLevel>]) as I<ASTLabelType>;
<if(backtracking)>end;<endif>
<endif>
}
)>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>
<if(!rewriteMode)>
Adaptor.AddChild(Root[<treeLevel>], <label>.Tree);
<else> <! rewrite mode !>
if (_First[<treeLevel>] = nil) then _First[<treeLevel>] := <label>.Tree;
<endif>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Tree",...)>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (State.Backtracking = 0) then <endif>Root[<treeLevel>] :=
Adaptor.BecomeRoot(<label>.Tree, Root[<treeLevel>]) as I<ASTLabelType>;
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".Tree",...)>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrack(...)>
```

```
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_Last := Input.LT(1) as I<ASTLabelType>;
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
T<terminalOptions.node>.Create((Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode)
<else>
(Locals['Stream_<token>'] as IRewriteRuleElementStream).NextNode
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>
if (State.Backtracking = 0) then
begin<\n>
<endif>
RetVal.Tree := Adaptor.RulePostProcessing(Root[0]) as I<ASTLabelType>;
<if(backtracking)>
end;
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Delphi/ASTTreeParser.stg

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```
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 *
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 * (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 * THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** Templates for building ASTs during tree parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  Each combination has its own template except that label/no label
 *  is combined into tokenRef, ruleRef, ...
 */

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
```

```
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
<endif>
>>


/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
 retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>


/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
```

```
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
 }
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>


/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
```

```
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.tokenRef(...)>
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>


/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>


// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
```

```
<else>
<super.matchSet(...)>
<endif>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>


matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>


// RULE REF AST
```

```
/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
```

```
<endif>
>>

/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>

/** Streams for token refs are tree nodes now; override to
 *  change NextToken to NextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,args) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
```

```
<endif>
%>


ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

/** Templates for building ASTs during tree parsing.

```
 *
 * Deal with many combinations.  Dimensions are:
 * Auto build or rewrite
 *   no label, label, list label  (label/no-label handled together)
 *   child, root
 *   token, set, rule, wildcard
 *
 * Each combination has its own template except that label/no label
 * is combined into tokenRef, ruleRef, ...
 */

finishedBacktracking(block) ::= <<
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
   <block>
<else>
<block>
<endif>
>>

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>

/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
   retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>

/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
```

```
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
if _first_<enclosingTreeLevel> is None:
   _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
   self.match(self.input, DOWN, None)
   <children:element()>
   self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
```

```
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
    _first_<treeLevel> = <label><\n>
})>
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
```

```
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
   _first_<treeLevel> = <label>
})>
<endif>
>>


// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
```

```
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
    _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>

/** rule when output=AST and tracking for rewrite */
```

```
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>

/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>

/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>

/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>

/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAToDFAConverter.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/NameSpaceChecker.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarReport2.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/IntArrayList.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/DelphiTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/AnalysisTimeoutException.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/Perl5Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LookaheadSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/BitSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LL1Analyzer.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/MutableInteger.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSpelunker.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/ActionScriptTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarDanglingStateMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/BuildDependencyGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/CompositeGrammar.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DecisionProbe.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CSharp2Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/CompositeGrammarTree.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAConfiguration.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Interpreter.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/SemanticContext.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/JavaScriptTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSemanticsMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarInsufficientPredicatesMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NFAConversionThread.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/RuleClosureTransition.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Rule.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Attribute.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Barrier.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/PythonTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/DOTGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ToolMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/RandomPhrase.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Strip.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/State.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/AnalysisRecursionOverflowException.java

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/Label.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/LeftRecursionCyclesMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CppTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/AssignTokenTypesBehavior.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/AttributeScope.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Interval.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarNonDeterminismMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DFAState.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/IntSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/Transition.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/Target.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/Interp.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/LL1DFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/RecursionOverflowMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarAnalysisAbortedMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ANTLRErrorListener.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/NonRegularDecisionMessage.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarSanity.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/PredicateLabel.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/NonLLStarDecisionException.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/ACyclicDFACodeGenerator.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/JavaTarget.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarAST.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/GrammarReport.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/ActionLabel.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/Graph.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/ErrorManager.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/DFA.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/tool/FASerializer.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/misc/OrderedHashSet.java
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/analysis/MachineProbe.java
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*/

```
/** Templates for building ASTs during tree parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  Each combination has its own template except that label/no label
 *  is combined into tokenRef, ruleRef, ...
 */

finishedBacktracking(block) ::= <<
<if(backtracking)>
if <actions.(actionScope).synpredgate>:
  <block>
<else>
<block>
<endif>
>>


/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
_first_0 = None
_last = None<\n>
>>
```

```
/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<finishedBacktracking({
<if(rewriteMode)>
retval.tree = _first_0
if self._adaptor.getParent(retval.tree) is not None and self._adaptor.isNil(self._adaptor.getParent(retval.tree)):
    retval.tree = self._adaptor.getParent(retval.tree)
<endif>
})>
>>


/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
_last = self.input.LT(1)
_save_last_<treeLevel> = _last
_first_<treeLevel> = None
<if(!rewriteMode)>
root_<treeLevel> = self._adaptor.nil()<\n>
<endif>
<root:element()>
<if(rewriteMode)>
<finishedBacktracking({
<if(root.el.rule)>
if _first_<enclosingTreeLevel> is None:
    _first_<enclosingTreeLevel> = <root.el.label>.tree<\n>
<else>
if _first_<enclosingTreeLevel> is None:
    _first_<enclosingTreeLevel> = <root.el.label><\n>
<endif>
})>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
    self.match(self.input, DOWN, None)
    <children:element()>
    self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)<\n>
```

```
<endif>
<if(!rewriteMode)>
self._adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>)<\n>
<endif>
_last = _save_last_<treeLevel>

>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
    _first_<treeLevel> = <label><\n>
})>
<endif>
>>

/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>

/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
```

```
<super.tokenRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
>>

/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>

/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.wildcard(...)>
<if(!rewriteMode)>
<finishedBacktracking({
<label>_tree = self._adaptor.dupTree(<label>)
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
})>
<else> <! rewrite mode !>
<finishedBacktracking({
if _first_<treeLevel> is None:
    _first_<treeLevel> = <label>
})>
<endif>
>>

// SET AST
matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
self._adaptor.addChild(root_<treeLevel>, <label>_tree)
```

```
})>
<endif>
}, ...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
_last = self.input.LT(1)
<super.matchSet(...)>
>>

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<finishedBacktracking({
<if(terminalOptions.node)>
<label>_tree = <terminalOptions.node>(<label>)
<else>
<label>_tree = self._adaptor.dupNode(<label>)
<endif><\n>
root_<treeLevel> = self._adaptor.becomeRoot(<label>_tree, root_<treeLevel>)
})>
<endif>
}, ...)>
>>

// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<finishedBacktracking({
<if(!rewriteMode)>
self._adaptor.addChild(root_<treeLevel>, <label>.tree)
<else> <! rewrite mode !>
if _first_<treeLevel> is None:
    _first_<treeLevel> = <label>.tree<\n>
<endif>
})>
>>

/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
```

```
<ruleRef(...)>
<listLabel(label, {<label>.tree})>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRef(...)>
<if(!rewriteMode)>
<finishedBacktracking({
root_<treeLevel> = self._adaptor.becomeRoot(<label>.tree, root_<treeLevel>)
})>
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(label, {<label>.tree})>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrack(...)>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefTrackAndListLabel(...)>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRootTrack(...)>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
_last = self.input.LT(1)
<super.ruleRefRuleRootTrackAndListLabel(...)>
>>


/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
```

```
createRewriteNodeFromElement(token,scope,terminalOptions={}) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>


ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<finishedBacktracking({
retval.tree = self._adaptor.rulePostProcessing(root_0)
})>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python3/ASTTreeParser.stg
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```
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```

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*/

/** Templates for building ASTs during tree parsing.
*
* Deal with many combinations. Dimensions are:
* Auto build or rewrite
*   no label, label, list label (label/no-label handled together)
*   child, root
*   token, set, rule, wildcard
*
* Each combination has its own template except that label/no label
* is combined into tokenRef, ruleRef, ...
*/
group ASTTreeParser;

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> _first_0 = null;
<ASTLabelType> _last = null;<\n>
>>

/** What to emit when there is no rewrite rule. For auto build
* mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= <<
<if(backtracking)>if (state.backtracking==0) {<endif>
<if(rewriteMode)>
retval.tree = (<ASTLabelType>)_first_0;
if (adaptor.getParent(retval.tree)!=null && adaptor.isNil(adaptor.getParent(retval.tree)))
  retval.tree = (<ASTLabelType>)adaptor.getParent(retval.tree);
<endif>
<if(backtracking)>}<endif>
>>

/** match ^(root children) in tree parser; override here to
* add tree construction actions.
*/
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = null;
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.nil();
<endif>

```
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 )<endif>
<if(root.el.rule)>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>.tree;
<else>
if ( _first_<enclosingTreeLevel>==null ) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( input.LA(1)==Token.DOWN ) {
  match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
  <children:element()>
  match(input, Token.UP, null); <checkRuleBacktrackFailure()>
}
<else>
match(input, Token.DOWN, null); <checkRuleBacktrackFailure()>
<children:element()>
match(input, Token.UP, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}<\n>
>>


// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
 *  setting of _last
 */
tokenRefBang(token,label,elementIndex) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
```

```
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if ( state.backtracking==0 )<endif>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>;
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRoot(...)>
<listLabel(elem=label,...)>
>>


// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
```

```
<endif><\n>
adaptor.addChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<endif>
}
)>
>>


matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
<matchSet(...)>
<noRewrite()> <! set return tree !>
>>


matchSetBang(s,label,elementIndex,postmatchCode) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<super.matchSet(..., postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<endif>
<if(terminalOptions.node)>
<label>_tree = new <terminalOptions.node>(<label>);
<else>
<label>_tree = (<ASTLabelType>)adaptor.dupNode(<label>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.becomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
}
)>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>
<if(!rewriteMode)>
adaptor.addChild(root_<treeLevel>, <label>.getTree());
<else> <! rewrite mode !>
if ( _first_<treeLevel>==null ) _first_<treeLevel> = <label>.tree;
<endif>
>>
```

```
/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.becomeRoot(<label>.getTree(), root_<treeLevel>);
<endif>
>>

/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabel(elem=label+".getTree()",...)>
>>

/** Streams for token refs are tree nodes now; override to
 *  change nextToken to nextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,scope) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextNode())
<else>
stream_<token>.nextNode()
<endif>
>>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!rewriteMode)>
<if(backtracking)>if ( state.backtracking==0 ) {<\n><endif>
retval.tree = (<ASTLabelType>)adaptor.rulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Perl5/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

/*

/*
New style messages. This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

group gnu;

location(file, line, column) ::= "<file>:<line>:"

message(id, text) ::= "<text> (<id>)"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/templates/messages/formats/gnu.stg
No license file was found, but licenses were detected in source scan.

/*

/*
New style messages. This file only contains the messages in English, but no
information about which file, line, or column it occurred in.
The location and message ids are taken out of the formats directory.
        Kay Roepke
*/
group en_US;

// TOOL ERRORS
// file errors
CANNOT_WRITE_FILE(arg,exception,stackTrace) ::= <<
cannot write file <arg>: <exception>
<stackTrace; separator="\n">
>>
CANNOT_CLOSE_FILE(arg,exception,stackTrace) ::= "cannot close file <arg>: <exception>"
CANNOT_FIND_TOKENS_FILE(arg) ::= "cannot find tokens file <arg>"
ERROR_READING_TOKENS_FILE(arg,exception,stackTrace) ::= <<
problem reading token vocabulary file <arg>: <exception>
<stackTrace; separator="\n">
>>
DIR_NOT_FOUND(arg,exception,stackTrace) ::= "directory not found: <arg>"
OUTPUT_DIR_IS_FILE(arg,exception,stackTrace) ::= "output directory is a file: <arg>"

CANNOT_OPEN_FILE(arg,exception,stackTrace) ::= "cannot find or open file: <arg><if(exception)>; reason: <exception><endif>"
CIRCULAR_DEPENDENCY() ::= "your grammars contain a circular dependency and cannot be sorted into a valid build order."

INTERNAL_ERROR(arg,arg2,exception,stackTrace) ::= <<
internal error: <arg> <arg2><if(exception)>: <exception><endif>
<stackTrace; separator="\n">
>>
INTERNAL_WARNING(arg) ::= "internal warning: <arg>"
ERROR_CREATING_ARTIFICIAL_RULE(arg,exception,stackTrace) ::= <<
problems creating lexer rule listing all tokens: <exception>
<stackTrace; separator="\n">
>>
TOKENS_FILE_SYNTAX_ERROR(arg,arg2) ::=
 "problems parsing token vocabulary file <arg> on line <arg2>"
CANNOT_GEN_DOT_FILE(arg,exception,stackTrace) ::=
 "cannot write DFA DOT file <arg>: <exception>"
BAD_ACTION_AST_STRUCTURE(exception,stackTrace) ::=
 "bad internal tree structure for action '<arg>': <exception>"
BAD_AST_STRUCTURE(arg,exception,stackTrace) ::= <<
bad internal tree structure '<arg>': <exception>
<stackTrace; separator="\n">
>>
FILE_AND_GRAMMAR_NAME_DIFFER(arg,arg2) ::=
 "file <arg2> contains grammar <arg>; names must be identical"
FILENAME_EXTENSION_ERROR(arg) ::=
 "file <arg> must end in a file extension, normally .g"

// code gen errors
MISSING_CODE_GEN_TEMPLATES(arg) ::=
 "cannot find code generation templates <arg>.stg"
MISSING_CYCLIC_DFA_CODE_GEN_TEMPLATES() ::=
 "cannot find code generation cyclic DFA templates for language <arg>"
CODE_GEN_TEMPLATES_INCOMPLETE(arg) ::=
 "at least one code generation template missing for language <arg>"
CANNOT_CREATE_TARGET_GENERATOR(arg,exception,stackTrace) ::=
 "cannot create target <arg> code generator: <exception>"
STRING_TEMPLATE_ERROR(arg,exception,stackTrace) ::=
 "template error: <arg>"
CANNOT_COMPUTE_SAMPLE_INPUT_SEQ() ::=
 "cannot generate a sample input sequence from lookahead DFA"

// grammar interpretation errors
/*
NO_VIABLE_DFA_ALT(arg,arg2) ::=
 "no viable transition from state <arg> on <arg2> while interpreting DFA"
*/

// GRAMMAR ERRORS
SYNTAX_ERROR(arg) ::= "syntax error: <arg>"
RULE_REDEFINITION(arg) ::=
 "rule <arg> redefinition"
LEXER_RULES_NOT_ALLOWED(arg) ::=
 "lexer rule <arg> not allowed in parser"
PARSER_RULES_NOT_ALLOWED(arg) ::=
 "parser rule <arg> not allowed in lexer"
CANNOT_FIND_ATTRIBUTE_NAME_IN_DECL(arg) ::=
 "cannot find an attribute name in attribute declaration"
NO_TOKEN_DEFINITION(arg) ::=
 "no lexer rule corresponding to token: <arg>"
UNDEFINED_RULE_REF(arg) ::=
 "reference to undefined rule: <arg>"
LITERAL_NOT_ASSOCIATED_WITH_LEXER_RULE(arg) ::=
 "literal has no associated lexer rule: <arg>"
CANNOT_ALIAS_TOKENS_IN_LEXER(arg) ::=
 "literals are illegal in lexer tokens{} section: <arg>"
ATTRIBUTE_REF_NOT_IN_RULE(arg,arg2) ::=
 "reference to attribute outside of a rule: <arg><if(arg2)>.<arg2><endif>"
UNKNOWN_ATTRIBUTE_IN_SCOPE(arg,arg2) ::=
 "unknown attribute for <arg>: <arg2>"
UNKNOWN_RULE_ATTRIBUTE(arg,arg2) ::=
 "unknown attribute for rule <arg>: <arg2>"
UNKNOWN_SIMPLE_ATTRIBUTE(arg,args2) ::=
 "attribute is not a token, parameter, or return value: <arg>"
ISOLATED_RULE_SCOPE(arg) ::=
 "missing attribute access on rule scope: <arg>"
INVALID_RULE_PARAMETER_REF(arg,arg2) ::=
 "cannot access rule <arg>'s parameter: <arg2>"
INVALID_RULE_SCOPE_ATTRIBUTE_REF(arg,arg2) ::=
 "cannot access rule <arg>'s dynamically-scoped attribute: <arg2>"
SYMBOL_CONFLICTS_WITH_GLOBAL_SCOPE(arg) ::=
 "symbol <arg> conflicts with global dynamic scope with same name"
WRITE_TO_READONLY_ATTR(arg,arg2,arg3) ::=
 "cannot write to read only attribute: $<arg><if(arg2)>.<arg2><endif>"
LABEL_CONFLICTS_WITH_RULE(arg) ::=
 "label <arg> conflicts with rule with same name"
LABEL_CONFLICTS_WITH_TOKEN(arg) ::=
 "label <arg> conflicts with token with same name"
LABEL_CONFLICTS_WITH_RULE_SCOPE_ATTRIBUTE(arg,arg2) ::=
 "label <arg> conflicts with rule <arg2>'s dynamically-scoped attribute with same name"
LABEL_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=
 "label <arg> conflicts with rule <arg2>'s return value or parameter with same name"
ATTRIBUTE_CONFLICTS_WITH_RULE(arg,arg2) ::=
 "rule <arg2>'s dynamically-scoped attribute <arg> conflicts with the rule name"
ATTRIBUTE_CONFLICTS_WITH_RULE_ARG_RETVAL(arg,arg2) ::=

"rule <arg2>'s dynamically-scoped attribute <arg> conflicts with<arg2>'s return value or parameter with same name"
LABEL_TYPE_CONFLICT(arg,arg2) ::=
 "label <arg> type mismatch with previous definition: <arg2>"
ARG_RETVAL_CONFLICT(arg,arg2) ::=
 "rule <arg2>'s argument <arg> conflicts a return value with same name"
NONUNIQUE_REF(arg) ::=
 "<arg> is a non-unique reference"
FORWARD_ELEMENT_REF(arg) ::=
 "illegal forward reference: <arg>"
MISSING_RULE_ARGS(arg) ::=
 "missing parameter(s) on rule reference: <arg>"
RULE_HAS_NO_ARGS(arg) ::=
 "rule <arg> has no defined parameters"
ARGS_ON_TOKEN_REF(arg) ::=
 "token reference <arg> may not have parameters"
ILLEGAL_OPTION(arg) ::=
 "illegal option <arg>"
LIST_LABEL_INVALID_UNLESS_RETVAL_STRUCT(arg) ::=
 "rule '+=' list labels are not allowed w/o output option: <arg>"
UNDEFINED_TOKEN_REF_IN_REWRITE(arg) ::=
 "reference to undefined token in rewrite rule: <arg>"
REWRITE_ELEMENT_NOT_PRESENT_ON_LHS(arg) ::=
 "reference to rewrite element <arg> without reference on left of ->"
UNDEFINED_LABEL_REF_IN_REWRITE(arg) ::=
 "reference to undefined label in rewrite rule: $<arg>"
NO_GRAMMAR_START_RULE (arg) ::=
 "grammar <arg>: no start rule (no rule can obviously be followed by EOF)"
EMPTY_COMPLEMENT(arg) ::= <<
<if(arg)>
set complement ~<arg> is empty
<else>
set complement is empty
<endif>
>>
UNKNOWN_DYNAMIC_SCOPE(arg) ::=
 "unknown dynamic scope: <arg>"
UNKNOWN_DYNAMIC_SCOPE_ATTRIBUTE(arg,arg2) ::=
 "unknown dynamically-scoped attribute for scope <arg>: <arg2>"
RULE_REF_AMBIG_WITH_RULE_IN_ALT(arg) ::=
 "reference $<arg> is ambiguous; rule <arg> is enclosing rule and referenced in the production (assuming enclosing rule)"
ISOLATED_RULE_ATTRIBUTE(arg) ::=
 "reference to locally-defined rule scope attribute without rule name: <arg>"
INVALID_ACTION_SCOPE(arg,arg2) ::=
 "unknown or invalid action scope for <arg2> grammar: <arg>"
ACTION_REDEFINITION(arg) ::=
 "redefinition of <arg> action"

DOUBLE_QUOTES_ILLEGAL(arg) ::=
 "string literals must use single quotes (such as \'begin\'): <arg>"
INVALID_TEMPLATE_ACTION(arg) ::=
 "invalid StringTemplate % shorthand syntax: '<arg>'"
MISSING_ATTRIBUTE_NAME() ::=
 "missing attribute name on $ reference"
ARG_INIT_VALUES_ILLEGAL(arg) ::=
 "rule parameters may not have init values: <arg>"
REWRITE_OR_OP_WITH_NO_OUTPUT_OPTION(arg) ::=
 "<if(arg)>rule <arg> uses <endif>rewrite syntax or operator with no output option; setting output=AST"
AST_OP_WITH_NON_AST_OUTPUT_OPTION(arg) ::=
 "AST operator with non-AST output option: <arg>"
NO_RULES(arg) ::= "grammar file <arg> has no rules"
MISSING_AST_TYPE_IN_TREE_GRAMMAR(arg) ::=
 "tree grammar <arg> has no ASTLabelType option"
REWRITE_FOR_MULTI_ELEMENT_ALT(arg) ::=
 "with rewrite=true, alt <arg> not simple node or obvious tree element; text attribute for rule not guaranteed to be
correct"
RULE_INVALID_SET(arg) ::=
 "Cannot complement rule <arg>; not a simple set or element"
HETERO_ILLEGAL_IN_REWRITE_ALT(arg) ::=
 "alts with rewrites can't use heterogeneous types left of ->"
NO_SUCH_GRAMMAR_SCOPE(arg,arg2) ::=
 "reference to undefined grammar in rule reference: <arg>.<arg2>"
NO_SUCH_RULE_IN_SCOPE(arg,arg2) ::=
 "rule <arg2> is not defined in grammar <arg>"
TOKEN_ALIAS_CONFLICT(arg,arg2) ::=
 "cannot alias <arg>; string already assigned to <arg2>"
TOKEN_ALIAS_REASSIGNMENT(arg,arg2) ::=
 "cannot alias <arg>; token name already assigned to <arg2>"
TOKEN_VOCAB_IN_DELEGATE(arg,arg2) ::=
 "tokenVocab option ignored in imported grammar <arg>"
INVALID_IMPORT(arg,arg2) ::=
 "<arg.grammarTypeString> grammar <arg.name> cannot import <arg2.grammarTypeString> grammar
<arg2.name>"
IMPORTED_TOKENS_RULE_EMPTY(arg,arg2) ::=
 "no lexer rules contributed to <arg> from imported grammar <arg2>"
IMPORT_NAME_CLASH(arg,arg2) ::=
 "combined grammar <arg.name> and imported <arg2.grammarTypeString> grammar <arg2.name> both generate
<arg2.recognizerName>; import ignored"
AST_OP_IN_ALT_WITH_REWRITE(arg,arg2) ::=
 "rule <arg> alt <arg2> uses rewrite syntax and also an AST operator"
WILDCARD_AS_ROOT(arg) ::= "Wildcard invalid as root; wildcard can itself be a tree"
CONFLICTING_OPTION_IN_TREE_FILTER(arg,arg2) ::= "option <arg>=<arg2> conflicts with tree grammar
filter mode"
ILLEGAL_OPTION_VALUE(arg, arg2) ::= "value '<arg2>' invalid for option <arg>"
ALL_OPS_NEED_SAME_ASSOC(arg) ::= "all operators of alt <alt> of left-recursive rule must have same
associativity"

RANGE_OP_ILLEGAL(arg) ::= "the .. range operator isn't allowed in parser rules"

// GRAMMAR WARNINGS

GRAMMAR_NONDETERMINISM(input,conflictingAlts,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it | alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Decision can match input such as "<input>" using multiple alternatives: <conflictingAlts; separator=", ">
<endif>
<if(disabled)><\n>As a result, alternative(s) <disabled; separator=","> were disabled for that
input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by
actions.<endif>
>>

DANGLING_STATE(danglingAlts,input) ::= <<
the decision cannot distinguish between alternative(s) <danglingAlts; separator=","> for input such as "<input>"
>>

UNREACHABLE_ALTS(alts) ::= <<
The following alternatives can never be matched: <alts; separator=","><\n>
>>

INSUFFICIENT_PREDICATES(upon,altToLocations,hasPredicateBlockedByAction) ::= <<
Input such as "<upon>" is insufficiently covered with predicates at locations: <altToLocations.keys:{alt|alt <alt>:
<altToLocations.(alt):{loc| line <loc.line>:<loc.column> at <loc.text>}; separator=", ">}; separator=",
"><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by actions.<endif>
>>

DUPLICATE_SET_ENTRY(arg) ::=
 "duplicate token type <arg> when collapsing subrule into set"

ANALYSIS_ABORTED(enclosingRule) ::= <<
ANTLR could not analyze this decision in rule <enclosingRule>; often this is because of recursive rule references
visible from the left edge of alternatives. ANTLR will re-analyze the decision with a fixed lookahead of k=1.
Consider using "options {k=1;}" for that decision and possibly adding a syntactic predicate.
>>

RECURSION_OVERLOW(alt,input,targetRules,callSiteStates) ::= <<
Alternative <alt>: after matching input such as <input> decision cannot predict what comes next due to recursion
overflow <targetRules,callSiteStates:{t,c|to <t> from <c:{s|<s.enclosingRule.name>};separator=", ">}; separator="
and ">
>>

LEFT_RECURSION(targetRules,alt,callSiteStates) ::= <<
Alternative <alt> discovers infinite left-recursion <targetRules,callSiteStates:{t,c|to <t> from

```
<c:{s|<s.enclosingRule>};separator=", ">}; separator=" and ">
>>


UNREACHABLE_TOKENS(tokens) ::= <<
The following token definitions can never be matched because prior tokens match the same input: <tokens;
separator=",">
>>


TOKEN_NONDETERMINISM(input,conflictingTokens,paths,disabled,hasPredicateBlockedByAction) ::=
<<
<if(paths)>
Decision can match input such as "<input>" using multiple alternatives:
<paths:{ it | alt <it.alt> via NFA path <it.states; separator=","><\n>}>
<else>
Multiple token rules can match input such as "<input>": <conflictingTokens; separator=", "><\n>
<endif>
<if(disabled)><\n>As a result, token(s) <disabled; separator=","> were disabled for that
input<endif><if(hasPredicateBlockedByAction)><\n>Semantic predicates were present but were hidden by
actions.<endif>
>>


LEFT_RECURSION_CYCLES(listOfCycles) ::= <<
The following sets of rules are mutually left-recursive <listOfCycles:{c| [<c:{r|<r.name>}; separator=", ">]};
separator=" and ">
>>


NONREGULAR_DECISION(ruleName,alts) ::= <<
[fatal] rule <ruleName> has non-LL(*) decision due to recursive rule invocations reachable from alts <alts;
separator=",">.  Resolve by left-factoring or using syntactic predicates or using backtrack=true option.
>>


/* l10n for message levels */
warning() ::= "warning"
error() ::= "error"
```

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/templates/messages/languages/en.stg
No license file was found, but licenses were detected in source scan.

/** ANTLR's code generator.
*
* Generate recognizers derived from grammars. Language independence
* achieved through the use of STGroup objects. All output
* strings are completely encapsulated in the group files such as Java.stg.
* Some computations are done that are unused by a particular language.
* This generator just computes and sets the values into the templates;
* the templates are free to use or not use the information.
*
* To make a new code generation target, define X.stg for language X
* by copying from existing Y.stg most closely releated to your language;
* e.g., to do CSharp.stg copy Java.stg. The template group file has a
* bunch of templates that are needed by the code generator. You can add
* a new target w/o even recompiling ANTLR itself. The language=X option
* in a grammar file dictates which templates get loaded/used.
*
* Some language like C need both parser files and header files. Java needs
* to have a separate file for the cyclic DFA as ANTLR generates bytecodes
* directly (which cannot be in the generated parser Java file). To facilitate
* this,
*
* cyclic can be in same file, but header, output must be searpate. recognizer
* is in outptufile.
*/

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/CodeGenerator.java
No license file was found, but licenses were detected in source scan.

/*

New style messages. This file contains the actual layout of the messages emitted by ANTLR.

The text itself is coming out of the languages/*stg files, according to the chosen locale.

This file contains the default format ANTLR uses.

*/

group antlr;

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/tool/templates/messages/formats/vs2005.stg
No license file was found, but licenses were detected in source scan.

group Dbg;

```
@parserBody.mixins() ::= <<
include ANTLR3::<if(profile)>Profile<else>Debug<endif>::ParserEvents
>>


@parserBody.additionalMembers() ::= <<
<if(grammar.grammarIsRoot)>
RULE_NAMES = [
 :invalid_rule, <grammar.allImportedRules:{rST|:<rST.name>}; wrap="\n ", separator=", ">
].freeze
<endif>
>>


@rule.body() ::= <<
in_rule(grammar_file_name, "<ruleName>") do
 @debug_listener.location(<ruleDescriptor.tree.line>, <ruleDescriptor.tree.column>)
```

```
 <@super.body()>

 @debug_listener.location(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.column>)
end
>>



// Common debug event triggers used by region overrides below
enterSubRule() ::= <<
in_subrule(<decisionNumber>) do<\n>
>>



exitSubRule() ::= <<
end<\n>
>>



enterDecision() ::= <<
in_decision(<decisionNumber>) do<\n>
>>



exitDecision() ::= <<
end<\n>
>>



enterAlt(n) ::= <<
in_alternative(<n>)<\n>
>>



// Region overrides that tell various constructs to add debugging triggers
@block.body() ::= <<
in_subrule(<decisionNumber>) do
 <@super.body()>
end
>>



// @blockBody.predecision() ::= "<enterSubRule()>"
// @blockBody.postdecision() ::= "<exitDecision()>"
// @blockBody.postbranch() ::= "<exitSubRule()>"
@blockBody.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end
```

```
>>


@ruleBlock.decision() ::= <<
in_decision(<decisionNumber>) do
 <@super.decision()>
end<\n>
>>


@ruleBlockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@blockSingleAlt.prealt() ::= "<enterAlt(n={1})>"


@positiveClosureBlock.loopBody() ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
end
>>


@positiveClosureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>


@positiveClosureBlockLoop.earlyExitException() ::= <<
@debug_listener.recognition_exception(eee)
>>


@closureBlock.loopBody() ::= <<
in_subrule(<decisionNumber>) do
 <@super.loopBody()>
end
>>


@closureBlockLoop.decisionBody() ::= <<
in_decision(<decisionNumber>) do
 <@super.decisionBody()>
end
>>
```

@altSwitchCase.prealt() ::= "<enterAlt(altNum)>" // altNum is arg of altSwitchCase

element(e) ::= <<
@debug_listener.location(<e.line>, <e.pos>) // e is arg of element
<super.element(e)>
>>

@matchSet.mismatchedSetException() ::= "@debug_listener.recognition_exception(mse)"

@dfaState.noViableAltException() ::= <<
nvae = NoViableAlternative("<description>", <decisionNumber>, <stateNumber>)
@debug_listener.recognition_exception(nvae)
raise(nvae)<\n>
>>

@dfaStateSwitch.noViableAltException() ::= <<
nvae = NoViableAlternative("<description>", <decisionNumber>, <stateNumber>)
@debug_listener.recognition_exception(nvae)
raise(nvae)<\n>
>>

dfaDecision(decisionNumber,description) ::= <<
begin
 @state.cyclic_decision = true
 <super.dfaDecision(...)>
rescue ANTLR3::Error::NoViableAlternative => nvae
 @debug_listener.recognition_exception(nvae)
 raise
end
>>

@cyclicDFA.errorMethod() ::= <<
def error(nvae)
 @recognizer.debug_listener.recognition_exception(nvae)
 super
end
>>
/** Force predicate validation to trigger an event */
evalPredicate(pred,description) ::= <<
predicate?("<description>") { <pred> }
>>

Found in path(s):

* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/Ruby/Dbg.stg
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*/

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/RubyTarget.java
No license file was found, but licenses were detected in source scan.

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[The "BSD license"]
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Add an adaptor property that knows how to build trees */
@headerFile.members() ::= <<
/* @headerFile.members() */
pANTLR3_BASE_TREE_ADAPTOR adaptor;
pANTLR3_VECTOR_FACTORY vectors;
/* End @headerFile.members() */
>>

/** Install the tree adaptor interface pointer and anything else that
* tree parsers and producers require.
*/
@genericParser.apifuncs() ::= <<
<if(PARSER)>
ADAPTOR = ANTLR3_TREE_ADAPTORNew(instream->tstream->tokenSource->strFactory);<\n>
<endif>
ctx->vectors = antlr3VectorFactoryNew(0);
>>

@genericParser.cleanup() ::= <<
ctx->vectors->close(ctx->vectors);
<if(PARSER)>
/* We created the adaptor so we must free it
*/
ADAPTOR->free(ADAPTOR);
<endif>
>>

@returnScope.ruleReturnMembers() ::= <<

<super.ASTLabelType()> tree;

```
>>

/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<ASTLabelType> root_0;<\n>
>>

ruleInitializations() ::= <<
<super.ruleInitializations()>
root_0 = NULL;<\n>
>>

ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <ASTLabelType> <it.label.text>_tree;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;}; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;}; separator="\n">
>>

/* Note that we defer the actual creation of any rewrite streams we need here and just initialize
 * them to NULL. This saves creating huge numbers of rewrite streams that cannot be used as only
 * one alt will be taken in a rule, but we are declaring all the streams here. So we define
 * a macro that conatins the create code, then use this macro later to check if the stream
 * has been created yet. Checking for NULL is almost free in C.
 */
ruleLabelInitializations() ::= <<
<super.ruleLabelInitializations()>
<ruleDescriptor.tokenLabels:{it | <it.label.text>_tree  = NULL;}; separator="\n">
<ruleDescriptor.tokenListLabels:{it | <it.label.text>_tree  = NULL;}; separator="\n">

<ruleDescriptor.allTokenRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRule<rewriteElementType>StreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"token
<it>"); \} }; separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
:{it | stream_<it>   = NULL;
#define CREATE_stream_<it>  if (stream_<it> == NULL) {stream_<it> =
antlr3RewriteRuleSubtreeStreamNewAE(ADAPTOR, RECOGNIZER, (pANTLR3_UINT8)"rule <it>"); \}};
separator="\n">

<if(ruleDescriptor.hasMultipleReturnValues)>
retval.tree  = NULL;
<endif>
```

```
>>


/**  a rule label including default value */
ruleLabelInitVal(label) ::= <<
<super.ruleLabelInitVal(...)>
<label.label.text>.tree = NULL;
>>


/** When doing auto AST construction, we must define some variables;
*  These should be turned off if doing rewrites.  This must be a "mode"
*  as a rule could have both rewrite and AST within the same alternative
*  block.
*/
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<endif>
<endif>
>>


@alt.initializations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));<\n>
<endif>
<endif>
<endif>
>>



// T r a c k i n g   R u l e   E l e m e n t s
//
/** ID but track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<token>;
stream_<token>->add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>


/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>
```

```
/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) {<endif>CREATE_stream_<token>; stream_<token>-
>add(stream_<token>, <label>, NULL);<if(backtracking)> }<endif><\n>
>>


wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabelTrack(...)>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) { <endif>CREATE_stream_<rule.name>;
stream_<rule.name>->add(stream_<rule.name>, <label>.tree, NULL);<if(backtracking)> }<endif>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabelAST(...)>
>>



// RULE REF AST



/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>
```

```
/* How to accumulate lists when we are doing rewrite tracking...
*/
listLabelTrack(label) ::= <<
/* listLabelTrack(label)
*/
if (list_<label> == NULL)
{
    list_<label>=ctx->vectors->newVector(ctx->vectors);
}
list_<label>->add(list_<label>, <label>.tree, NULL);
>>


/* How to accumulate lists of rule outputs (only allowed with AST
* option but if the user is going to walk the tree, they will want
* all their custom elements from rule returns.
*
* Normally, we use inline structures (which the compiler lays down
* code to copy from heap allocations. However, here we want to accumulate copies
* of the returned structures because we are adding them to a list. This only makes sense if the
* grammar is not rewriting the tree as a tree rewrite only preserves the tree, not the object/structure
* returned from the rule. The rewrite will extract the tree pointer. However, if we are not going to
* do a tree re-write, then the user may wish to iterate the structures returned by the rule in
* action code and will expect the user defined returns[] elements to be available when they do this.
* Hence we cannot just preserve the tree that was returned. So, we must copy the local structure and provide
* a function that can free the allocated space. We cannot know how to free user allocated elements and
* presume that the user will know to do this using their own factories for the structures they allocate.
*/
listLabelAST(label) ::= <<
if (list_<label> == NULL)
{
    list_<label>=ctx->vectors->newVector(ctx->vectors);
}
{
    RETURN_TYPE_<label> * tcopy;

    tcopy = (RETURN_TYPE_<label> *)ANTLR3_MALLOC(sizeof(RETURN_TYPE_<label>)); /* Note no
memory allocation checks! */
    ANTLR3_MEMCPY((void *)(tcopy), (const void *)&<label>, sizeof(RETURN_TYPE_<label>));
    list_<label>->add(list_<label>, (void *)tcopy, freeScope);  /* Add whatever the return type is */<\n>
}
>>


// R e w r i t e

rewriteCode(
 alts,
```

```
description,
referencedElementsDeep, // ALL referenced elements to right of ->
referencedTokenLabels,
referencedTokenListLabels,
referencedRuleLabels,
referencedRuleListLabels,
  referencedWildcardLabels,
  referencedWildcardListLabels,
rewriteBlockLevel,
enclosingTreeLevel,
treeLevel) ::=
<<

/* AST REWRITE
 * elements          : <referencedElementsDeep; separator=", ">
 * token labels      : <referencedTokenLabels; separator=", ">
 * rule labels       : <referencedRuleLabels; separator=", ">
 * token list labels : <referencedTokenListLabels; separator=", ">
 * rule list labels  : <referencedRuleListLabels; separator=", ">
 */
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) <\n>
<endif>
{
<rewriteCodeLabelsDecl()>
<rewriteCodeLabelsInit()>
root_0      = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
<prevRuleRootRef()>.tree    = root_0;
<alts:rewriteAlt(); separator="else ">
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = (<ASTLabelType>)(ADAPTOR->rulePostProcessing(ADAPTOR, root_0));
INPUT->replaceChildren(INPUT, ADAPTOR->getParent(ADAPTOR, retval.start),
            ADAPTOR->getChildIndex(ADAPTOR, retval.start),
            ADAPTOR->getChildIndex(ADAPTOR, _last),
            retval.tree);
<endif>
<endif>
<prevRuleRootRef()>.tree = root_0; // set result root
<rewriteCodeLabelsFree()>

}
>>

rewriteCodeLabelsDecl() ::= <<
<referencedTokenLabels
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
  separator="\n"
```

```
>
<referencedTokenListLabels
  :{it | pANTLR3_REWRITE_RULE_<rewriteElementType>_STREAM stream_<it>;};
  separator="\n"
>
<referencedRuleLabels
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
  separator="\n"
>
<referencedRuleListLabels
  :{it | pANTLR3_REWRITE_RULE_SUBTREE_STREAM stream_<it>;};
  separator="\n"
>
>>


rewriteCodeLabelsInit() ::= <<
<referencedTokenLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEE(ADAPTOR, RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>);};
separator="\n"
>
<referencedTokenListLabels
:{it | stream_<it>=antlr3RewriteRule<rewriteElementType>StreamNewAEV(ADAPTOR, RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>); };
separator="\n"
>
<referencedRuleLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEE(ADAPTOR, RECOGNIZER,
(pANTLR3_UINT8)"token <it>", <it>.tree != NULL ? <it>.tree : NULL);};
separator="\n"
>
<referencedRuleListLabels
:{it | stream_<it>=antlr3RewriteRuleSubtreeStreamNewAEV(ADAPTOR, RECOGNIZER,
(pANTLR3_UINT8)"token <it>", list_<it>);};
separator="\n"
>
>>
rewriteCodeLabelsFree() ::= <<
<referencedTokenLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>); };
separator="\n"
>
<referencedTokenListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
<referencedRuleLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
```

```
separator="\n"
>
<referencedRuleListLabels
:{it | if (stream_<it> != NULL) stream_<it>->free(stream_<it>);};
separator="\n"
>
>>

/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
 if ( <referencedElementsDeep:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) };
separator="|| "> )
 {
  <alt>
 }
 <referencedElementsDeep:{el | if ( stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>

rewriteClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
{
 while ( <referencedElements:{el | (stream_<el> != NULL && stream_<el>->hasNext(stream_<el>)) }; separator="||
"> )
 {
  <alt>
 }
 <referencedElements:{el | if (stream_<el> != NULL) stream_<el>->reset(stream_<el>);<\n>}>
}<\n>
>>
RewriteEarlyExitException() ::=
<<
```

```
CONSTRUCTEX();
EXCEPTION->type        = ANTLR3_REWRITE_EARLY_EXCEPTION;
EXCEPTION->name        = (void *)ANTLR3_REWRITE_EARLY_EXCEPTION_NAME;
>>
rewritePositiveClosureBlock(
 alt,
 rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements,  // elements in immediately block; no nested blocks
 description) ::=
<<
if (<referencedElements:{el | (stream_<el> == NULL || !stream_<el>->hasNext(stream_<el>)) }; separator="|| "> )
{
  <RewriteEarlyExitException()>
}
else
{
 while ( <referencedElements:{el | (stream_<el>->hasNext(stream_<el>)) }; separator="|| "> ) {
  <alt>
 }
 <referencedElements:{el | stream_<el>->reset(stream_<el>);<\n>}>
}
>>


rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>)
{
  <a.alt>
}<\n>
<else>
{
  <a.alt>
}<\n>
<endif>
>>


/** For empty rewrites: "r : ... -> ;" */
rewriteEmptyAlt() ::= "root_0 = NULL; /* \<-- rewriteEmptyAlt()) */"


rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
  <ASTLabelType> root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->nilNode(ADAPTOR));
  <root:rewriteElement()>
  <children:rewriteElement()>
  ADAPTOR->addChild(ADAPTOR, root_<enclosingTreeLevel>, root_<treeLevel>);
```

```
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextNode(stream_<label>));<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextNode(stream_<label>));<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRootToken(ADAPTOR, stream_<label> == NULL ?
NULL : stream_<label>->nextToken(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR,
<createRewriteNodeFromElement(...)>, root_<treeLevel>));<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR,
```

```
<createImaginaryNode(tokenType=token, ...)>, root_<treeLevel>));\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
 *  let's us refer to $rule to mean previous value.  I am reusing the
 *  variable 'tree' sitting in retval struct to hold the value of root_0 right
 *  before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule,dup) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<rule> == NULL ? NULL : stream_<rule>-
>nextTree(stream_<rule>));\n>
>>

rewriteRuleRefRoot(rule,dup) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<rule> == NULL ? NULL
: stream_<rule>->nextNode(stream_<rule>), root_<treeLevel>));\n>
>>

rewriteNodeAction(action) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, <action>);\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = (<ASLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, <action>, root_<treeLevel>));\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot(ADAPTOR, stream_<label> == NULL ? NULL
```

```
: stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = (<ASTLabelType>)(ADAPTOR->becomeRoot((<ASTLabelType>)(stream_<label> == NULL
? NULL : stream_<label>->nextNode(stream_<label>), root_<treeLevel>));<\n>
>>

rewriteWildcardLabelRef(label) ::= <<
ADAPTOR->addChild(ADAPTOR, root_<treeLevel>, stream_<label> == NULL ? NULL : stream_<label>-
>nextTree(stream_<label>));<\n>
>>

createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
<terminalOptions.node>New(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
<if(args)>

#if <length(args)> == 2
 (<ASTLabelType>)ADAPTOR->createTypeTokenText(ADAPTOR, <tokenType>, TOKTEXT(<args; separator=",
">))
#else
 (<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)<args;
separator=", ">)
#endif

<else>
(<ASTLabelType>)ADAPTOR->createTypeText(ADAPTOR, <tokenType>, (pANTLR3_UINT8)"<tokenType>")
<endif>
<endif>
>>

createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<terminalOptions.node>New(stream_<token>->nextToken(stream_<token>)<if(args)>, <args; separator=",
"><endif>)
<else>
<if(args)> <! must create new node from old !>

#if <length(args)> == 2
ADAPTOR->createTypeTokenText(ADAPTOR, <token>->getType(<token>, TOKTEXT(<token>, <args;
separator=", ">)) /* JIMI */
#else
ADAPTOR->createTypeToken(ADAPTOR, <token>->getType(<token>, <token>, <args; separator=", ">)
#endif
```

```
<else>
stream_<token> == NULL ? NULL : stream_<token>->nextNode(stream_<token>)
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/AST.stg
No license file was found, but licenses were detected in source scan.

```
/*
* [The "BSD license"]
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* Copyright (c) 2005-2007 Kunle Odutola
* Copyright (c) 2011 Sam Harwell
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* THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
* (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
* THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/** Template subgroup to add template rewrite output
*  If debugging, then you'll also get STDbg.stg loaded.
*/

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr.StringTemplate;
```

```
using Antlr.StringTemplate.Language;
<if(!backtracking)>
using Hashtable = System.Collections.Hashtable;
<endif>

>>

/** Add this to each rule's return value struct */
@returnScope.ruleReturnMembers() ::= <<
private StringTemplate _st;
public StringTemplate Template { get { return _st; } set { _st = value; } }
public override string ToString() { return (Template==null) ? string.Empty : Template.ToString(); }
>>

@genericParser.members() ::= <<
<@super.members()>
protected StringTemplateGroup templateLib = new StringTemplateGroup("<name>Templates",
typeof(AngleBracketTemplateLexer) );

public StringTemplateGroup TemplateLib
{
 get { return this.templateLib; }
 set { this.templateLib = value; }
}

/// \<summary> Allows convenient multi-value initialization:
///  "new STAttrMap().Add(...).Add(...)"
/// \</summary>
protected class STAttrMap : Hashtable
{
 public STAttrMap Add(string attrName, object value)
 {
  base.Add(attrName, value);
  return this;
 }
 public STAttrMap Add(string attrName, int value)
 {
  base.Add(attrName, value);
  return this;
 }
}
>>

/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label+".Template",...)>
>>
```

```
rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> )
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>


replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 ((IToken)retval.Start).TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>


rewriteTemplateAlt() ::= <<
// <it.description>
<if(it.pred)>
if (<it.pred>) {
  retval.Template = <it.alt>;
}<\n>
<else>
{
  retval.Template = <it.alt>;
}<\n>
<endif>
>>


rewriteEmptyTemplate(alts) ::= <<
null;
>>


/** Invoke a template with a set of attribute name/value pairs.
```

```
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
 */
rewriteExternalTemplate(name,args) ::= <<
templateLib.GetInstanceOf("<name>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <<
templateLib.GetInstanceOf(<expr><if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>


/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <<
new StringTemplate(templateLib, "<template>"<if(args)>,
 new STAttrMap()<args:{a | .Add("<a.name>", <a.value>)}>
 <endif>)
>>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).SetAttribute("<attrName>",<expr>);
>>


/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(templateLib,<stringExpr>)
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp2/ST.stg
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 * Copyright (c) 2007-2008 Johannes Luber
```

/** Templates for building ASTs during tree parsing.

*

* Deal with many combinations. Dimensions are:

* Auto build or rewrite

*   no label, label, list label (label/no-label handled together)

*   child, root

*   token, set, rule, wildcard

*

* Each combination has its own template except that label/no label

* is combined into tokenRef, ruleRef, ...

*/

/** Add a variable to track last element matched */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
<if(!ruleDescriptor.isSynPred)>
<ASTLabelType> _first_0 = default(<ASTLabelType>);
<ASTLabelType> _last = default(<ASTLabelType>);
<endif>
>>

```
/** What to emit when there is no rewrite rule.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel=false, treeLevel=false) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(rewriteMode)>
retval.Tree = (<ASTLabelType>)_first_0;
if (adaptor.GetParent(retval.Tree)!=null && adaptor.IsNil(adaptor.GetParent(retval.Tree)))
  retval.Tree = (<ASTLabelType>)adaptor.GetParent(retval.Tree);
<endif>
<if(backtracking)>}<endif>
<endif>
>>


/** match ^(root children) in tree parser; override here to
 *  add tree construction actions.
 */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
{
<ASTLabelType> _save_last_<treeLevel> = _last;
<ASTLabelType> _first_<treeLevel> = default(<ASTLabelType>);
<if(!rewriteMode)>
<ASTLabelType> root_<treeLevel> = (<ASTLabelType>)adaptor.Nil();
<endif>
<root:element()>
<if(rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(root.el.rule)>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>.Tree;
<else>
if (_first_<enclosingTreeLevel> == null) _first_<enclosingTreeLevel> = <root.el.label>;
<endif>
<endif>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down) {
  Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
  <children:element()>
  Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
```

```
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<enclosingTreeLevel>, root_<treeLevel>);
<endif>
_last = _save_last_<treeLevel>;
}
<else>
<super.tree(...)>
<endif>
>>

// TOKEN AST STUFF

/** ID! and output=AST (same as plain tokenRef) 'cept add
*  setting of _last
*/
tokenRefBang(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<else>
<super.tokenRefBang(...)>
<endif>
>>

/** ID auto construct */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
```

```
<else>
<super.tokenRef(...)>
<endif>
>>


/** label+=TOKEN auto construct */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRef(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefAndListLabel(...)>
<endif>
>>


/** ^(ID ...) auto construct */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.tokenRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>}<endif>
<endif>
<else>
<super.tokenRefRuleRoot(...)>
<endif>
>>


/** Match ^(label+=TOKEN ...) auto construct */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,...)>
<else>
<super.tokenRefRuleRootAndListLabel(...)>
<endif>
>>
```

```
/** Match . wildcard and auto dup the node/subtree */
wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.wildcard(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.DupTree(<label>);
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>}<endif>
<else> <! rewrite mode !>
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>;
<endif>
<else>
<super.wildcard(...)>
<endif>
>>

// SET AST

matchSet(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
adaptor.AddChild(root_<treeLevel>, <label>_tree);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSet(...)>
<endif>
>>

matchRuleBlockSet(s,label,terminalOptions,elementIndex,postmatchCode,treeLevel="0") ::= <<
```

```
<if(!ruleDescriptor.isSynPred)>
<matchSet(...)>
<noRewrite(...)> <! set return tree !>
<else>
<super.matchRuleBlockSet(...)>
<endif>
>>


matchSetBang(s,label,terminalOptions,elementIndex,postmatchCode) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.matchSet(...)>
<else>
<super.matchSetBang(...)>
<endif>
>>


matchSetRuleRoot(s,label,terminalOptions,elementIndex,debug) ::= <<
<if(!ruleDescriptor.isSynPred)>
<super.matchSet(postmatchCode={
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<if(terminalOptions.node)>
<label>_tree = new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.tex
t)>,<terminalOptions.text; format="string"><endif>);
<else>
<label>_tree =
(<ASTLabelType>)adaptor.DupNode(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(termin
alOptions.text)>,<terminalOptions.text; format="string"><endif>);
<endif><\n>
root_<treeLevel> = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_<treeLevel>);
<if(backtracking)>\}<endif>
<endif>
}, ...
)>
<else>
<super.matchSetRuleRoot(...)>
<endif>
>>


// RULE REF AST

/** rule auto construct */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
```

```
<if(backtracking)>if (<actions.(actionScope).synpredgate>)<endif>
<if(!rewriteMode)>
adaptor.AddChild(root_<treeLevel>, <label>.Tree);
<else> <! rewrite mode !>
if (_first_<treeLevel> == null) _first_<treeLevel> = <label>.Tree;
<endif>
<else>
<super.ruleRef(...)>
<endif>
>>


/** x+=rule auto construct */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefAndListLabel(...)>
<endif>
>>


/** ^(rule ...) auto construct */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRef(...)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_<treeLevel> =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_<treeLevel>);
<endif>
<else>
<super.ruleRefRuleRoot(...)>
<endif>
>>


/** ^(x+=rule ...) auto construct */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},...)>
<else>
<super.ruleRefRuleRootAndListLabel(...)>
<endif>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
```

```
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrack(...)>
<else>
<super.ruleRefTrack(...)>
<endif>
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefTrackAndListLabel(...)>
<else>
<super.ruleRefTrackAndListLabel(...)>
<endif>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRootTrack(...)>
<else>
<super.ruleRefRuleRootTrack(...)>
<endif>
>>


/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
_last = (<ASTLabelType>)input.LT(1);
<super.ruleRefRuleRootTrackAndListLabel(...)>
<else>
<super.ruleRefRuleRootTrackAndListLabel(...)>
<endif>
>>


/** Streams for token refs are tree nodes now; override to
 *  change NextToken to NextNode.
 */
createRewriteNodeFromElement(token,terminalOptions,args) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif>stream_<token>.NextNode())
<else>
stream_<token>.NextNode()
<endif>
%>
```

```
ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(!ruleDescriptor.isSynPred)>
<if(!rewriteMode)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
<if(backtracking)>}<endif>
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp2/ASTTreeParser.stg
No license file was found, but licenses were detected in source scan.

```
/** The API version of the runtime that recognizers generated by this runtime
 *  need.
 */
```

```
apiVersion() ::= "1"

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile(LEXER,PARSER,TREE_PARSER, actionScope, actions,
        docComment, recognizer,
        name, tokens, tokenNames, rules, cyclicDFAs,
        bitsets, buildTemplate, buildAST, rewriteMode, profile,
        backtracking, synpreds, memoize, numRules,
        fileName, ANTLRVersion, generatedTimestamp, trace,
        scopes, superClass, literals) ::=
<<
# $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<@imports>
import sys
from antlr3 import *
<if(TREE_PARSER)>
from antlr3.tree import *<\n>
<endif>
<@end>

<actions.(actionScope).header>

<! <docComment> !>

# for convenience in actions
HIDDEN = BaseRecognizer.HIDDEN

# token types
<tokens:{it | <it.name>=<it.type>}; separator="\n">

# token names
tokenNamesMap = {
  0: "\<invalid>", 1: "\<EOR>", 2: "\<DOWN>", 3: "\<UP>",
  <tokens:{it | <it.type>: "<it.name>"}; wrap, separator=", ">
}
Token.registerTokenNamesMap(tokenNamesMap)

<recognizer>

<if(actions.(actionScope).main)>
<actions.(actionScope).main>
<else>
def main(argv, stdin=sys.stdin, stdout=sys.stdout, stderr=sys.stderr):
<if(LEXER)>
    from antlr3.main import LexerMain
```

```
    main = LexerMain(<recognizer.name>)<\n>
<endif>
<if(PARSER)>
    from antlr3.main import ParserMain
    main = ParserMain("<recognizer.grammar.name>Lexer", <recognizer.name>)<\n>
<endif>
<if(TREE_PARSER)>
    from antlr3.main import WalkerMain
    main = WalkerMain(<recognizer.name>)<\n>
<endif>
    main.stdin = stdin
    main.stdout = stdout
    main.stderr = stderr
    main.execute(argv)<\n>
<endif>

<actions.(actionScope).footer>

if __name__ == '__main__':
    main(sys.argv)

>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode,
    labelType="CommonToken", superClass="Lexer") ::= <<
<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
del dirname

<grammar.directDelegates:
{g|from .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
    <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>

    grammarFileName = "<fileName>"
    api_version = <apiVersion()>

    def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input=None, state=None):
        if state is None:
            state = RecognizerSharedState()
        super().__init__(input, state)

<if(memoize)>
<if(grammar.grammarIsRoot)>
```

```
      self._state.ruleMemo = {}
<endif>
<endif>

    <grammar.directDelegates:
     {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
    <grammar.directDelegates:
     {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
    <grammar.delegators:
     {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
    <last(grammar.delegators):
     {g|self.gParent = <g:delegateName()>}; separator="\n">
    self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

    <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

    <actions.lexer.init>


  <actions.lexer.members>


<if(filterMode)>
  <filteringNextToken()>
<endif>
  <rules; separator="\n\n">

  <synpreds:{p | <lexerSynpred(p)>}>

  <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>


>>

/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 * for matches.  No error can be generated upon error; just rewind, consume
 * a token and then try again.  backtracking needs to be set as well.
 * Make rule memoization happen only at levels above 1 as we start mTokens
 * at backtracking==1.
 */
filteringNextToken() ::= <<
def nextToken(self):
    while True:
        if self.input.LA(1) == EOF:
            return self.makeEOFToken()
```

```
        self._state.token = None
        self._state.channel = DEFAULT_CHANNEL
        self._state.tokenStartCharIndex = self.input.index()
        self._state.tokenStartCharPositionInLine = self.input.charPositionInLine
        self._state.tokenStartLine = self.input.line
        self._state._text = None
        try:
            m = self.input.mark()
            try:
                # means we won't throw slow exception
                self._state.backtracking = 1
                try:
                    self.mTokens()
                finally:
                    self._state.backtracking = 0

            except BacktrackingFailed:
                # mTokens backtracks with synpred at backtracking==2
                # and we set the synpredgate to allow actions at level 1.
                self.input.rewind(m)
                self.input.consume() # advance one char and try again

            else:
                self.emit()
                return self._state.token

        except RecognitionException as re:
            # shouldn't happen in backtracking mode, but...
            self.reportError(re)
            self.recover(re)


def memoize(self, input, ruleIndex, ruleStartIndex, success):
    if self._state.backtracking > 1:
        # is Lexer always superclass?
        super().memoize(input, ruleIndex, ruleStartIndex, success)


def alreadyParsedRule(self, input, ruleIndex):
    if self._state.backtracking > 1:
        return super().alreadyParsedRule(input, ruleIndex)
    return False


>>


actionGate() ::= "self._state.backtracking == 0"
```

```
filteringActionGate() ::= "self._state.backtracking == 1"

/** How to generate a parser */

genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass, labelType, members,
        rewriteElementType, filterMode, init, ASTLabelType="Object") ::= <<
# token names
tokenNames = [
    "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>",
    <tokenNames; wrap, separator=", ">
]

<scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScopeClass(scope=it)><endif>}>

<if(grammar.directDelegates)>
# path hack to allow absolute import of related grammars.
from os.path import dirname
__path__ = [dirname(__file__)]
del dirname

<grammar.directDelegates:
{g|from .<g.recognizerName> import <g.recognizerName>}; separator="\n">
<endif>

<rules:{it|<ruleAttributeScopeClass(scope=it.ruleDescriptor.ruleScope)>}>

class <grammar.recognizerName>(<@superClassName><superClass><@end>):
    grammarFileName = "<fileName>"
    api_version = <apiVersion()>
    tokenNames = tokenNames

    def __init__(self<grammar.delegators:{g|, <g:delegateName()>}>, input, state=None, *args, **kwargs):
        if state is None:
            state = RecognizerSharedState()

        <@args()>
        super().__init__(input, state, *args, **kwargs)

<if(memoize)>
<if(grammar.grammarIsRoot)>
        self._state.ruleMemo = {}
<endif>
<endif>

        <cyclicDFAs:{dfa | <cyclicDFAInit(dfa)>}; separator="\n">

        <scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeStack(scope=it)><endif>}>
```

```
<rules:{it | <ruleAttributeScopeStack(scope=it.ruleDescriptor.ruleScope)>}>

<init>

<grammar.delegators:
 {g|self.<g:delegateName()> = <g:delegateName()>}; separator="\n">
<grammar.directDelegates:
 {g|self.<g:delegateName()> = <g.recognizerName>(<trunc(g.delegators):{p|<p:delegateName()>, }>self, input,
state)}; separator="\n">
<grammar.directDelegates:
 {g|<g.delegates:{h|self.<h:delegateName()> = self.<g:delegateName()>.<h:delegateName()>};
separator="\n">}; separator="\n">
<last(grammar.delegators):
 {g|self.gParent = self.<g:delegateName()>}; separator="\n">
self.delegates = [<grammar.delegates: {g|self.<g:delegateName()>}; separator = ", ">]

<@init><@end>


 <@members><@end>

 <members>

 <rules; separator="\n\n">

 <! generate rule/method definitions for imported rules so they
    appear to be defined in this recognizer. !>
 <grammar.delegatedRules:{ruleDescriptor| <delegateRule(ruleDescriptor)> }; separator="\n">

 <synpreds:{p | <synpred(p)>}>

 <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>

 <bitsets:{it | FOLLOW_<it.name>_in_<it.inName><it.tokenIndex> = frozenset([<it.tokenTypes:{it |
<it>};separator=", ">])<\n>}>

>>

delegateRule(ruleDescriptor) ::= <<
def <ruleDescriptor.name>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<\ >  <if(ruleDescriptor.hasReturnValue)>return
<endif>self.<ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name>(<if(ruleDescriptor.parameterScope)
><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", "><endif>)


>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
```

```
    ASTLabelType="Object", superClass="Parser", labelType="Token",
    members={<actions.parser.members>},
    init={<actions.parser.init>}
    ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TokenStream", superClass,
        labelType, members, "Token",
        false, init, ASTLabelType)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="Object",
superClass={<if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif>},
 members={<actions.treeparser.members>},
        init={<actions.treeparser.init>}
        ) ::= <<
<genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, "TreeNodeStream", superClass,
        labelType, members, "Node",
        filterMode, init, ASTLabelType)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 *  rules created for syntactic predicates.  As they never have return values
 *  nor parameters etc..., just give simplest possible method.  Don't do
 *  any of the normal memoization stuff in here either; it's a waste.
 *  As predicates cannot be inlined into the invoking rule, they need to
 *  be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
# $ANTLR start "<ruleName>"
def <ruleName>_fragment(self, <ruleDescriptor.parameterScope:parameterScope()>):
    <ruleLabelDefs()>
<if(trace)>
    self.traceIn("<ruleName>_fragment", <ruleDescriptor.index>)
    try:
        <block>

    finally:
        self.traceOut("<ruleName>_fragment", <ruleDescriptor.index>)

<else>
    <block>
<endif>
```

```
# $ANTLR end "<ruleName>"


>>

synpred(name) ::= <<
def <name>(self):
  self._state.backtracking += 1
  <@start()>
  start = self.input.mark()
  try:
     self.<name>_fragment()
  except BacktrackingFailed:
     success = False
  else:
     success = True
  self.input.rewind(start)
  <@stop()>
  self._state.backtracking -= 1
  return success


>>

lexerSynpred(name) ::= <<
<synpred(name)>
>>

ruleMemoization(name) ::= <<
<if(memoize)>
if self._state.backtracking > 0 and self.alreadyParsedRule(self.input, <ruleDescriptor.index>):
  # for cached failed rules, alreadyParsedRule will raise an exception
  success = True
  return <ruleReturnValue()>

<endif>
>>

/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if self._state.backtracking > 0:
  raise BacktrackingFailed

<endif>
>>

/** How to generate code for a rule.  This includes any return type
```

```
*  data aggregates required for multiple return values.
*/
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<returnScope(scope=ruleDescriptor.returnScope)>

# $ANTLR start "<ruleName>"
# <fileName>:<description>
<ruleDescriptor.actions.decorate>
def <ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
    self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
    <ruleScopeSetUp()>
    <ruleDeclarations()>
    <ruleLabelDefs()>
    <ruleDescriptor.actions.init>
    <@preamble()>
    <@body><ruleBody()><@end>
    <@postamble()>
    return <ruleReturnValue()>

# $ANTLR end "<ruleName>"
>>

ruleBody() ::= <<
<if(memoize)>
<if(backtracking)>
success = False<\n>
<endif>
<endif>
try:
    try:
        <ruleMemoization(name=ruleName)>
        <block>
        <ruleCleanUp()>
        <(ruleDescriptor.actions.after):execAction()>

<if(memoize)>
<if(backtracking)>
        success = True<\n>
<endif>
<endif>
<if(exceptions)>
    <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
    <actions.(actionScope).rulecatch>
```

```
<else>
  except RecognitionException as re:
     self.reportError(re)
     self.recover(self.input, re)
     <@setErrorReturnValue()>

<endif>
<else>
  finally:
     pass

<endif>
<endif>
finally:
<if(trace)>
  self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
  <memoize()>
  <ruleScopeCleanUp()>
  <finally>
  pass
>>

catch(decl,action) ::= <<
except <e.decl>:
  <e.action>

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval = self.<ruleDescriptor.name>_return()
retval.start = self.input.LT(1)<\n>
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.name> = <if(a.initValue)><a.initValue><else>None<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = self.input.index()
<endif>
>>

ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.append(<it>_scope())}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.append(<it.name>_scope())}; separator="\n">
>>
```

```
ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it | self.<it>_stack.pop()}; separator="\n">
<ruleDescriptor.ruleScope:{it | self.<it.name>_stack.pop()}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,
 ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it | <it.label.text> = None}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels,
 ruleDescriptor.wildcardTreeListLabels]
  :{it | list_<it.label.text> = None}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:{it | <it.label.text> = None}; separator="\n">
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it | <it.label.text> = None}; separator="\n"
>
<ruleDescriptor.charLabels:{it | <it.label.text> = None}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
  :{it | list_<it.label.text> = None}; separator="\n"
>
>>


ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>


ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.stop = self.input.LT(-1)<\n>
<endif>
```

```
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if self._state.backtracking > 0:
    self.memoize(self.input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex, success)

<endif>
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
# $ANTLR start "<ruleName>"
def m<ruleName>(self, <ruleDescriptor.parameterScope:parameterScope()>):
<if(trace)>
    self.traceIn("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
    <ruleScopeSetUp()>
    <ruleDeclarations()>
<if(memoize)>
<if(backtracking)>
    success = False<\n>
<endif>
<endif>
    try:
<if(nakedBlock)>
        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block><\n>
<else>
        _type = <ruleName>
        _channel = DEFAULT_CHANNEL

        <ruleMemoization(name=ruleName)>
        <lexerRuleLabelDefs()>
        <ruleDescriptor.actions.init>
        <block>
        <ruleCleanUp()>
        self._state.type = _type
        self._state.channel = _channel
        <(ruleDescriptor.actions.after):execAction()>
<endif>
```

```
<if(memoize)>
<if(backtracking)>
    success = True<\n>
<endif>
<endif>

  finally:
<if(trace)>
    self.traceOut("<ruleName>", <ruleDescriptor.index>)<\n>
<endif>
    <ruleScopeCleanUp()>
    <memoize()>
    pass

# $ANTLR end "<ruleName>"


>>


/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
def mTokens(self):
  <block><\n>


>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@body><blockBody()><@end>
>>

blockBody() ::= <<
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<@prebranch()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
<@postbranch()>
>>
```

```
/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
# <fileName>:<description>
alt<decisionNumber> = <maxAlt>
<decls>
<@predecision()>
<@decision><decision><@end>
<@postdecision()>
<alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
>>


ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
# <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>


/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
# <fileName>:<description>
cnt<decisionNumber> = 0
<decls>
<@preloop()>
<@loopBody>
<positiveClosureBlockLoop()>
<@end>
<@postloop()>
>>


positiveClosureBlockLoop() ::= <<
while True: #loop<decisionNumber>
    alt<decisionNumber> = <maxAlt>
    <@predecision()>
    <@decisionBody><decision><@end>
    <@postdecision()>
    <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
```

```
    else:
        if cnt<decisionNumber> >= 1:
            break #loop<decisionNumber>


        <ruleBacktrackFailure()>
        eee = EarlyExitException(<decisionNumber>, self.input)
        <@earlyExitException()>
        raise eee

    cnt<decisionNumber> += 1
>>


positiveClosureBlockSingleAlt ::= positiveClosureBlock

/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
# <fileName>:<description>
<decls>
<@preloop()>
<@loopBody>
<closureBlockLoop()>
<@end>
<@postloop()>
>>


closureBlockLoop() ::= <<
while True: #loop<decisionNumber>
    alt<decisionNumber> = <maxAlt>
    <@predecision()>
    <@decisionBody><decision><@end>
    <@postdecision()>
    <alts:{a | <altSwitchCase(i, a)>}; separator="\nel">
    else:
        break #loop<decisionNumber>
>>


closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 *  so we can just use the normal block template
 */
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
 *  number.  A DFA predicts the alternative and then a simple switch
```

```
*  does the jump to the code that actually matches that alternative.
*/
altSwitchCase(altNum,alt) ::= <<
if alt<decisionNumber> == <altNum>:
   <@prealt()>
   <alt>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt, treeLevel,rew) ::= <<
# <fileName>:<description>
pass <! so empty alternatives are a valid block !>
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
>>


/** What to emit when there is no rewrite.  For auto build
*  mode, does nothing.
*/
noRewrite(rewriteBlockLevel, treeLevel) ::= ""


// E L E M E N T S


/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>


/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label> = <endif>self.match(self.input, <token>,
self.FOLLOW_<token>_in_<ruleName><elementIndex>)
>>


/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(token,label,elementIndex,terminalOptions)>
<listLabel(label, label)>
>>


listLabel(label, elem) ::= <<
if list_<label> is None:
   list_<label> = []
list_<label>.append(<elem>)<\n>
>>
```

```
/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.match(<char>)
>>


/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchRange(<a>, <b>)
>>


/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
if <s>:
  self.input.consume()
  <postmatchCode>
<if(!LEXER)>
  self._state.errorRecovery = False<\n>
<endif>

else:
  <ruleBacktrackFailure()>
  mse = MismatchedSetException(None, self.input)
  <@mismatchedSetException()>
<if(LEXER)>
  self.recover(mse)
  raise mse
<else>
  raise mse
  <! use following code to make it recover inline; remove throw mse;
  self.recoverFromMismatchedSet(
     self.input, mse, self.FOLLOW_set_in_<ruleName><elementIndex>
     )
  !>
<endif>
<\n>
>>


matchRuleBlockSet ::= matchSet
```

```
matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(label, label)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex="0") ::= <<
<if(label)>
<label>Start = self.getCharIndex()
self.match(<string>)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(input=self.input, type=INVALID_TOKEN_TYPE, channel=DEFAULT_CHANNEL,
start=<label>Start, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(<string>)
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label> = self.input.LT(1)<\n>
<endif>
self.matchAny()
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabel(label,label)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = self.input.LA(1)<\n>
<endif>
self.matchAny()
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(label, elementIndex)>
<listLabel(label, label)>
>>


/** Match a rule reference by invoking it possibly with arguments
```

```
 *  and a return value or values. The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
self._state.following.append(self.FOLLOW_<rule.name>_in_<ruleName><elementIndex>)
<if(label)><label> = <endif>self.<if(scope)><scope:delegateName()>.<endif><rule.name>(<args; separator=",
">)<\n>
self._state.following.pop()
>>


/** ids+=rule */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(rule,label,elementIndex,args,scope)>
<listLabel(label, label)>
>>


/** A lexer rule reference
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
<label> = <labelType>(
  input=self.input,
  type=INVALID_TOKEN_TYPE,
  channel=DEFAULT_CHANNEL,
  start=<label>Start<elementIndex>,
  stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">)
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(rule,label,args,elementIndex,scope)>
<listLabel(label, label)>
>>
```

```
/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
<label>Start<elementIndex> = self.getCharIndex()
<label>StartLine<elementIndex> = self.getLine()
<label>StartCharPos<elementIndex> = self.getCharPositionInLine()
self.match(EOF)
<label> = <labelType>(input=self.input, type=EOF, channel=DEFAULT_CHANNEL,
start=<label>Start<elementIndex>, stop=self.getCharIndex()-1)
<label>.line = <label>StartLine<elementIndex>
<label>.charPositionInLine = <label>StartCharPos<elementIndex>
<else>
self.match(EOF)
<endif>
>>


// used for left-recursive rules
recRuleDefArg()                    ::= "<recRuleArg()>"
recRuleArg()                  ::= "_p"
recRuleAltPredicate(ruleName, opPrec) ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()          ::= "root_0 = $<ruleName>_primary.tree"
recRuleSetReturnAction(src, name)    ::= "$<name> = $<src>.<name>"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
   enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if self.input.LA(1) == DOWN:
  self.match(self.input, DOWN, None)
  <children:element()>
  self.match(self.input, UP, None)

<else>
self.match(self.input, DOWN, None)
<children:element()>
self.match(self.input, UP, None)
<endif>
>>

/** Every predicate is used as a validating predicate (even when it is
*  also hoisted into a prediction expression).
*/
validateSemanticPredicate(pred,description) ::= <<
if not (<evalPredicate(pred, description)>):
  <ruleBacktrackFailure()>
  raise FailedPredicateException(self.input, "<ruleName>", "<description>")
```

>>

// F i x e d D F A (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>
>>

/** Same as a normal DFA state except that we don't examine lookahead
 * for the bypass alternative. It delays error detection but this
 * is faster, smaller, and more what people expect. For (X)? people
 * expect "if (LA(1)==X) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel">
>>

/** A DFA state that is actually the loopback decision of a closure
 * loop. If end-of-token (EOT) predicts any of the targets then it
 * should act like a default clause (i.e., no error can be generated).
 * This is used only in the lexer so that for ('a')* on the end of a rule
 * anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = self.input.LA(<k>)<\n>
<edges; separator="\nel"><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt> <! if no edges, don't gen ELSE !>
<else>
else:
   alt<decisionNumber> = <eotPredictsAlt>
<\n>
<endif>
<endif>
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>"

/** A simple edge with an expression. If the expression is satisfied,
 * enter to the target state. To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if (<labelExpr>) <if(predicates)>and (<predicates>)<endif>:
   <targetState>
>>

// F i x e d D F A (switch case)

/** A DFA state where a SWITCH may be generated. The code generator
 * decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
<!
 FIXME: this is one of the few occasion, where I miss a switch statement
 in Python. ATM this is implemented as a list of if .. elif ..
 This may be replaced by faster a dictionary lookup, when I find a solution
 for the cases when an edge is not a plain dfaAcceptState.
!>
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
else:
<if(eotPredictsAlt)>
   alt<decisionNumber> = <eotPredictsAlt>
<else>
   <ruleBacktrackFailure()>
   nvae = NoViableAltException("<description>", <decisionNumber>, <stateNumber>, self.input)<\n>
   <@noViableAltException()>
   raise nvae<\n>
<endif>

>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
LA<decisionNumber> = self.input.LA(<k>)
<edges; separator="\nel">
<if(eotPredictsAlt)>

```
else:
  alt<decisionNumber> = <eotPredictsAlt>
<endif>
>>


dfaEdgeSwitch(labels, targetState) ::= <<
if LA<decisionNumber> in {<labels; separator=", ">}:
  <targetState>
>>


// C y c l i c  D F A


/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = self.dfa<decisionNumber>.predict(self.input)
>>


/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
 */
cyclicDFA(dfa) ::= <<
# lookup tables for DFA #<dfa.decisionNumber>


DFA<dfa.decisionNumber>_eot = DFA.unpack(
  "<dfa.javaCompressedEOT; wrap="\"\n    \"">"
  )


DFA<dfa.decisionNumber>_eof = DFA.unpack(
  "<dfa.javaCompressedEOF; wrap="\"\n    \"">"
  )


DFA<dfa.decisionNumber>_min = DFA.unpack(
  "<dfa.javaCompressedMin; wrap="\"\n    \"">"
  )


DFA<dfa.decisionNumber>_max = DFA.unpack(
  "<dfa.javaCompressedMax; wrap="\"\n    \"">"
  )


DFA<dfa.decisionNumber>_accept = DFA.unpack(
```

```
    "<dfa.javaCompressedAccept; wrap="\"\n    \"">"
    )

DFA<dfa.decisionNumber>_special = DFA.unpack(
    "<dfa.javaCompressedSpecial; wrap="\"\n    \"">"
    )



DFA<dfa.decisionNumber>_transition = [
    <dfa.javaCompressedTransition:{s|DFA.unpack("<s; wrap="\"\n\"">")}; separator=",\n">
]

# class definition for DFA #<dfa.decisionNumber>

class DFA<dfa.decisionNumber>(DFA):
    pass

    <@errorMethod()>

<if(dfa.specialStateSTs)>
    def specialStateTransition(self_, s, input):
        # convince pylint that my self_ magic is ok ;)
        # pylint: disable-msg=E0213

        # pretend we are a member of the recognizer
        # thus semantic predicates can be evaluated
        self = self_.recognizer

        _s = s

        <dfa.specialStateSTs:{state | if s == <i0>: <! compressed special state numbers 0..n-1 !>
    <state>}; separator="\nel">

<if(backtracking)>
        if self._state.backtracking > 0:
            raise BacktrackingFailed

<endif>
        nvae = NoViableAltException(self_.getDescription(), <dfa.decisionNumber>, _s, input)
        self_.error(nvae)
        raise nvae<\n>
<endif>

>>

cyclicDFAInit(dfa) ::= <<
self.dfa<dfa.decisionNumber> = self.DFA<dfa.decisionNumber>(
    self, <dfa.decisionNumber>,
```

```
  eot = self.DFA<dfa.decisionNumber>_eot,
  eof = self.DFA<dfa.decisionNumber>_eof,
  min = self.DFA<dfa.decisionNumber>_min,
  max = self.DFA<dfa.decisionNumber>_max,
  accept = self.DFA<dfa.decisionNumber>_accept,
  special = self.DFA<dfa.decisionNumber>_special,
  transition = self.DFA<dfa.decisionNumber>_transition
  )<\n>
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
LA<decisionNumber>_<stateNumber> = input.LA(1)<\n>
<if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
index<decisionNumber>_<stateNumber> = input.index()
input.rewind()<\n>
<endif>
s = -1
<edges; separator="\nel">
<if(semPredState)> <! return input cursor to state before we rewound !>
input.seek(index<decisionNumber>_<stateNumber>)<\n>
<endif>
if s >= 0:
  return s
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if (<labelExpr>)<if(predicates)> and (<predicates>)<endif>:
  s = <targetStateNumber><\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
se:
  s = <targetStateNumber><\n>
>>



// D F A   E X P R E S S I O N S

andPredicates(left,right) ::= "((<left>) and (<right>))"
```

orPredicates(operands) ::= "(<operands; separator=\" or \">)"

notPredicate(pred) ::= "not (<evalPredicate(pred, {})>)"

evalPredicate(pred,description) ::= "(<pred>)"

evalSynPredicate(pred,description) ::= "self.<pred>()"

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "self.input.LA(<k>) == <atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(<lower> \<= LA<decisionNumber>_<stateNumber> \<= <upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "(<lower> \<=
self.input.LA(<k>) \<= <upper>)"

lookaheadSetTest(values,k,valuesAsInt) ::= <%
LA<decisionNumber>_<stateNumber> in {<values; separator=", ">}
%>

isolatedLookaheadSetTest(values,k,valuesAsInt) ::= <%
self.input.LA(<k>) in {<values; separator=", ">}
%>

lookaheadVarName(k) ::= "LA<decisionNumber>_<stateNumber>"
isolatedLookaheadVarName(k) ::= "self.input.LA(<k>)"

setTest(ranges) ::= "<ranges; separator=\" or \">"

// A T T R I B U T E S

globalAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
    <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>

```
globalAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>


ruleAttributeScopeClass(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
class <scope.name>_scope(object):
  def __init__(self):
     <scope.attributes:{it | self.<it.decl> = None}; separator="\n">

<endif>
<endif>
>>


ruleAttributeScopeStack(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
self.<scope.name>_stack = []<\n>
<endif>
<endif>
>>


delegateName(d) ::= <<
<if(d.label)><d.label><else>g<d.name><endif>
>>


/** Define a rule label including default value */
ruleLabelDef(label) ::= <<
<label.label.text> = None
>>


returnStructName(r) ::= "<r.name>_return"


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
class <ruleDescriptor:returnStructName()>(<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope):
  def __init__(self):
     super().__init__()
```

```
<if(scope)><scope.attributes:{it | self.<it.decl> = None}; separator="\n"><endif>
<@ruleReturnInit()>


  <@ruleReturnMembers()>

<endif>
>>

parameterScope(scope) ::= <<
<if(scope)><scope.attributes:{it | <it.decl>}; separator=", "><endif>
>>

parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name> = <expr>"

scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
self.<scope>_stack[-<negIndex>].<attr.name>
<else>
<if(index)>
self.<scope>_stack[<index>].<attr.name>
<else>
self.<scope>_stack[-1].<attr.name>
<endif>
<endif>
%>

/* not applying patch because of bug in action parser!

<if(negIndex)>
((len(self.<scope>_stack) - <negIndex> - 1) >= 0 and [self.<scope>_stack[-<negIndex>].<attr.name>] or [None])[0]
<else>
<if(index)>
((<index> \< len(self.<scope>_stack)) and [self.<scope>_stack[<index>].<attr.name>] or [None])[0]
<else>
((len(self.<scope>_stack) > 0) and [self.<scope>_stack[-1].<attr.name>] or [None])[0]
<endif>
<endif>

*/

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[-<negIndex>].<attr.name> = <expr>
<else>
```

```
<if(index)>
<!FIXME: this seems not to be used by ActionTranslator...!>
self.<scope>_stack[<index>].<attr.name> = <expr>
<else>
self.<scope>_stack[-1].<attr.name> = <expr>
<endif>
<endif>
%>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "self.<scope>_stack"


/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
((<scope> is not None) and [<scope>.<attr.name>] or [None])[0]
<else>
<scope>
<endif>
%>


returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
<endif>
%>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name> = <expr>
<else>
<attr.name> = <expr>
<endif>
%>


/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"


/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach; and they are evaluated early;
```

// they cannot see TREE_PARSER or PARSER attributes for example. :(

tokenLabelPropertyRef_text(scope,attr) ::= "<scope>.text"
tokenLabelPropertyRef_type(scope,attr) ::= "<scope>.type"
tokenLabelPropertyRef_line(scope,attr) ::= "<scope>.line"
tokenLabelPropertyRef_pos(scope,attr) ::= "<scope>.charPositionInLine"
tokenLabelPropertyRef_channel(scope,attr) ::= "<scope>.channel"
tokenLabelPropertyRef_index(scope,attr) ::= "<scope>.index"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"

ruleLabelPropertyRef_start(scope,attr) ::= "<scope>.start"
ruleLabelPropertyRef_stop(scope,attr) ::= "<scope>.stop"
ruleLabelPropertyRef_tree(scope,attr) ::= "<scope>.tree"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
((<scope> is not None) and [self.input.getTokenStream().toString(
  self.input.getTreeAdaptor().getTokenStartIndex(<scope>.start),
  self.input.getTreeAdaptor().getTokenStopIndex(<scope>.start)
)] or [None])[0]
<else>
((<scope> is not None) and [self.input.toString(<scope>.start,<scope>.stop)] or [None])[0]
<endif>
%>
ruleLabelPropertyRef_st(scope,attr) ::= "((<scope> is not None) and [<scope>.st] or [None])[0]"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "((<scope> is not None) and [<scope>.type] or [0])[0]"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "((<scope> is not None) and [<scope>.line] or [0])[0]"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "((<scope> is not None) and [<scope>.charPositionInLine] or [0])[0]"
lexerRuleLabelPropertyRef_channel(scope,attr) ::= "((<scope> is not None) and [<scope>.channel] or [0])[0]"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "((<scope> is not None) and [<scope>.index] or [0])[0]"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "((<scope> is not None) and [<scope>.text] or [None])[0]"
lexerRuleLabelPropertyRef_int(scope,attr) ::= "((<scope> is not None) and [int(<scope>.text)] or [0])[0]"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop" //mmm... or input.LT(-1)??
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= "self.input.toString(retval.start, self.input.LT(-1))"
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "self.text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "self._state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "self._state.tokenStartCharPositionInLine"

lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "self._state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(self.getCharIndex()-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int(<scope>.text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree =<expr>"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st =<expr>"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<else>
if <actions.(actionScope).synpredgate>:
  pass
  <action>

<endif>
<else>
#action start
<action>
#action end
<endif>
>>

/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"

// M I S C (properties, etc...)

codeFileExtension() ::= ".py"

true_value() ::= "True"
false_value() ::= "False"

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/Python3/Python3.stg

No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 * Copyright (c) 2011 Terence Parr
 * All rights reserved.
 *
 * Conversion to C#:
 * Copyright (c) 2011 Sam Harwell, Pixel Mine, Inc.
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 *
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 * modification, are permitted provided that the following conditions
 * are met:
 * 1. Redistributions of source code must retain the above copyright
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 * THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 * (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 * THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** Templates for building ASTs during normal parsing.
 *
 *  Deal with many combinations.  Dimensions are:
 *  Auto build or rewrite
 *    no label, label, list label  (label/no-label handled together)
 *    child, root
 *    token, set, rule, wildcard
 *
 *  The situation is not too bad as rewrite (->) usage makes ^ and !
 *  invalid. There is no huge explosion of combinations.
 */

@rule.setErrorReturnValue() ::= <<
retval.Tree = (<ASTLabelType>)adaptor.ErrorNode(input, retval.Start, input.LT(-1), re);
```

```
<! System.out.WriteLine("<ruleName> returns "+((CommonTree)retval.tree).toStringTree()); !>
>>


// TOKEN AST STUFF

/** ID and output=AST */
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (state.backtracking == 0) {<endif>
<\n><label>_tree = <createNodeFromToken(...)>;
<\n>adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)><\n>}<endif>
<endif>
%>


/** ID! and output=AST (same as plain tokenRef) */
tokenRefBang(token,label,elementIndex,terminalOptions={}) ::= "<super.tokenRef(...)>"

/** ID^ and output=AST */
tokenRefRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <%
<super.tokenRef(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)><\n>if (<actions.(actionScope).synpredgate>) {<endif>
<\n><label>_tree = <createNodeFromToken(...)>;
<\n>root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)><\n>}<endif>
<endif>
%>


/** ids+=ID! and output=AST */
tokenRefBangAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefBang(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** label+=TOKEN when output=AST but not rewrite alt */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match label+=TOKEN^ when output=AST but not rewrite alt */
tokenRefRuleRootAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRefRuleRoot(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>
```

```
// SET AST

// the match set stuff is interesting in that it uses an argument list
// to pass code to the default matchSet; another possible way to alter
// inherited code.  I don't use the region stuff because I need to pass
// different chunks depending on the operator.  I don't like making
// the template name have the operator as the number of templates gets
// large but this is the most flexible--this is as opposed to having
// the code generator call matchSet then add root code or ruleroot code
// plus list label plus ...  The combinations might require complicated
// rather than just added on code.  Investigate that refactoring when
// I have more time.

matchSet(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= <<
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <createNodeFromToken(...)>);<endif>},
...)>
>>

matchRuleBlockSet(s,label,elementIndex,postmatchCode,treeLevel="0",terminalOptions={}) ::= <<
<matchSet(...)>
>>

matchSetBang(s,label,elementIndex,postmatchCode,terminalOptions={}) ::= "<super.matchSet(...)>"

// note there is no matchSetTrack because -> rewrites force sets to be
// plain old blocks of alts: (A|B|...|C)

matchSetRuleRoot(s,label,elementIndex,debug,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);
<endif>
<super.matchSet(postmatchCode={<if(!ruleDescriptor.isSynPred)><if(backtracking)>if
(<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<createNodeFromToken(...)>, root_0);<endif>}, ...)>
>>

// RULE REF AST

/** rule when output=AST */
ruleRef(rule,label,elementIndex,args,scope) ::= <%
<super.ruleRef(...)>
<if(!ruleDescriptor.isSynPred)>
<\n><if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>adaptor.AddChild(root_0, <label>.Tree);
<endif>
%>

/** rule! is same as normal rule ref */
```

```
ruleRefBang(rule,label,elementIndex,args,scope) ::= "<super.ruleRef(...)>"

/** rule^ */
ruleRefRuleRoot(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) <endif>root_0 =
(<ASTLabelType>)adaptor.BecomeRoot(<label>.Tree, root_0);
>>

/** x+=rule when output=AST */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule! when output=AST is a rule ref with list addition */
ruleRefBangAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefBang(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

/** x+=rule^ */
ruleRefRuleRootAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<listLabelElem(elem={<label>.Tree},elemType=ASTLabelType,...)>
>>

// WILDCARD AST

wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
adaptor.AddChild(root_0, <label>_tree);
<if(backtracking)>}<endif>
<endif>
>>

wildcardBang(label,elementIndex) ::= "<super.wildcard(token=[],...)>"

wildcardRuleRoot(token,label,elementIndex,terminalOptions={}) ::= <<
<super.wildcard(...)>
<if(!ruleDescriptor.isSynPred)>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
<label>_tree = (<ASTLabelType>)adaptor.Create(<label>);
root_0 = (<ASTLabelType>)adaptor.BecomeRoot(<label>_tree, root_0);
<if(backtracking)>}<endif>
```

```
<endif>
>>

createNodeFromToken(label,terminalOptions={}) ::= <%
<if(terminalOptions.node)>
new
<terminalOptions.node>(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>)
<else>
(<ASTLabelType>)adaptor.Create(<if(terminalOptions.type)><terminalOptions.type>,<endif><label><if(terminalOptions.text)>,<terminalOptions.text; format="string"><endif>)
<endif>
%>

ruleCleanUp() ::= <<
<super.ruleCleanUp()>
<if(backtracking)>if (<actions.(actionScope).synpredgate>) {<endif>
retval.Tree = (<ASTLabelType>)adaptor.RulePostProcessing(root_0);
adaptor.SetTokenBoundaries(retval.Tree, retval.Start, retval.Stop);
<if(backtracking)>}<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp3/ASTParser.stg
No license file was found, but licenses were detected in source scan.

```
/*
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http://www.temporal-wave.com
http://www.linkedin.com/in/jimidle

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IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
```

```
/*
 * This code generating template and the associated C runtime was produced by:
 * Jim Idle jimi|hereisanat|idle|dotgoeshere|ws.
 * If it causes the destruction of the Universe, it will be pretty cool so long as
 * I am in a different one at the time.
 */
cTypeInitMap ::= [
 "int"    : "0",            // Integers    start out being 0
 "long"   : "0",            // Longs       start out being 0
 "float"  : "0.0",          // Floats      start out being 0
 "double" : "0.0",          // Doubles     start out being 0
 "ANTLR3_BOOLEAN"  : "ANTLR3_FALSE",  // Booleans    start out being Antlr C for false
 "byte"   : "0",            // Bytes       start out being 0
 "short"  : "0",            // Shorts      start out being 0
 "char"   : "0"             // Chars       start out being 0
]

leadIn(type) ::=
<<
/** \file
 *  This <type> file was generated by $ANTLR version <ANTLRVersion>
 *
 *     - From the grammar source file : <fileName>
 *     -                    On : <generatedTimestamp>
<if(LEXER)>
 *     -            for the lexer : <name>Lexer
<endif>
<if(PARSER)>
 *     -            for the parser : <name>Parser
<endif>
<if(TREE_PARSER)>
 *     -        for the tree parser : <name>TreeParser
<endif>
 *
 * Editing it, at least manually, is not wise.
 *
 * C language generator and runtime by Jim Idle, jimi|hereisanat|idle|dotgoeshere|ws.
 *
```

```
*
>>

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile( LEXER,
       PARSER,
       TREE_PARSER,
       actionScope,
       actions,
       docComment,
       recognizer,
       name,
       tokens,
       tokenNames,
       rules,
       cyclicDFAs,
       bitsets,
       buildTemplate,
       buildAST,
       rewriteMode,
       profile,
       backtracking,
       synpreds,
       memoize,
       numRules,
       fileName,
       ANTLRVersion,
       generatedTimestamp,
       trace,
       scopes,
       superClass,
       literals
       ) ::=
<<
<leadIn("C source")>
*/
// [The "BSD license"]
// Copyright (c) 2005-2009 Jim Idle, Temporal Wave LLC
// http://www.temporal-wave.com
// http://www.linkedin.com/in/jimidle
//
// All rights reserved.
//
// Redistribution and use in source and binary forms, with or without
// modification, are permitted provided that the following conditions
// are met:
```

```
<if(actions.(actionScope).header)>


/* =============================================================================
 * This is what the grammar programmer asked us to put at the top of every file.
 */
<actions.(actionScope).header>
/* End of Header action.
 * =============================================================================
 */
<endif>


/* --------------------------------------
 * Include the ANTLR3 generated header file.
 */
#include    "<name>.h"
<actions.(actionScope).postinclude>
/* -------------------------------------- */


<docComment>


<if(literals)>
/** String literals used by <name> that we must do things like MATCHS() with.
 *  C will normally just lay down 8 bit characters, and you can use L"xxx" to
 *  get wchar_t, but wchar_t is 16 bits on Windows, which is not UTF32 and so
 *  we perform this little trick of defining the literals as arrays of UINT32
 *  and passing in the address of these.
 */
<literals:{it | static ANTLR3_UCHAR lit_<i>[]  = <it>;}; separator="\n">
```

<endif>

/* MACROS that hide the C interface implementations from the
* generated code, which makes it a little more understandable to the human eye.
* I am very much against using C pre-processor macros for function calls and bits
* of code as you cannot see what is happening when single stepping in debuggers
* and so on. The exception (in my book at least) is for generated code, where you are
* not maintaining it, but may wish to read and understand it. If you single step it, you know that input()
* hides some indirect calls, but is always referring to the input stream. This is
* probably more readable than ctx->input->istream->input(snarfle0->blarg) and allows me to rejig
* the runtime interfaces without changing the generated code too often, without
* confusing the reader of the generated output, who may not wish to know the gory
* details of the interface inheritance.
*/

#define CTX ctx

/* Aids in accessing scopes for grammar programmers
*/
#undef SCOPE_TYPE
#undef SCOPE_STACK
#undef SCOPE_TOP
#define SCOPE_TYPE(scope)   p<name>_##scope##_SCOPE
#define SCOPE_STACK(scope) p<name>_##scope##Stack
#define SCOPE_TOP(scope)   ctx->p<name>_##scope##Top
#define SCOPE_SIZE(scope) ctx->p<name>_##scope##Stack_limit
#define SCOPE_INSTANCE(scope, i) (ctx->SCOPE_STACK(scope)->get(ctx->SCOPE_STACK(scope),i))

<if(LEXER)>

/* Macros for accessing things in a lexer
*/
#undef   LEXER
#undef   RECOGNIZER
#undef   RULEMEMO
#undef   GETCHARINDEX
#undef   GETLINE
#undef   GETCHARPOSITIONINLINE
#undef   EMIT
#undef   EMITNEW
#undef   MATCHC
#undef   MATCHS
#undef   MATCHRANGE
#undef   LTOKEN
#undef   HASFAILED

```
#undef   FAILEDFLAG
#undef   INPUT
#undef   STRSTREAM
#undef   LA
#undef   HASEXCEPTION
#undef   EXCEPTION
#undef   CONSTRUCTEX
#undef   CONSUME
#undef   LRECOVER
#undef   MARK
#undef   REWIND
#undef   REWINDLAST
#undef   BACKTRACKING
#undef MATCHANY
#undef MEMOIZE
#undef HAVEPARSEDRULE
#undef GETTEXT
#undef INDEX
#undef SEEK
#undef PUSHSTREAM
#undef POPSTREAM
#undef SETTEXT
#undef SETTEXT8


#define   LEXER    ctx->pLexer
#define   RECOGNIZER      LEXER->rec
#define LEXSTATE   RECOGNIZER->state
#define TOKSOURCE   LEXSTATE->tokSource
#define   GETCHARINDEX()  LEXER->getCharIndex(LEXER)
#define   GETLINE()   LEXER->getLine(LEXER)
#define   GETTEXT()   LEXER->getText(LEXER)
#define   GETCHARPOSITIONINLINE() LEXER->getCharPositionInLine(LEXER)
#define   EMIT()    LEXSTATE->type = _type; LEXER->emit(LEXER)
#define   EMITNEW(t)   LEXER->emitNew(LEXER, t)
#define   MATCHC(c)   LEXER->matchc(LEXER, c)
#define   MATCHS(s)   LEXER->matchs(LEXER, s)
#define   MATCHRANGE(c1,c2)    LEXER->matchRange(LEXER, c1, c2)
#define   MATCHANY()   LEXER->matchAny(LEXER)
#define   LTOKEN    LEXSTATE->token
#define   HASFAILED()   (LEXSTATE->failed == ANTLR3_TRUE)
#define   BACKTRACKING  LEXSTATE->backtracking
#define   FAILEDFLAG   LEXSTATE->failed
#define   INPUT    LEXER->input
#define   STRSTREAM   INPUT
#define ISTREAM    INPUT->istream
#define INDEX()    ISTREAM->index(ISTREAM)
#define SEEK(n)    ISTREAM->seek(ISTREAM, n)
#define   EOF_TOKEN   &(LEXSTATE->tokSource->eofToken)
```

```
#define   HASEXCEPTION()   (LEXSTATE->error == ANTLR3_TRUE)
#define   EXCEPTION   LEXSTATE->exception
#define   CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
#define   LRECOVER()   LEXER->recover(LEXER)
#define   MARK()   ISTREAM->mark(ISTREAM)
#define   REWIND(m)   ISTREAM->rewind(ISTREAM, m)
#define   REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define MEMOIZE(ri,si)   RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define HAVEPARSEDRULE(r)   RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define PUSHSTREAM(str)   LEXER->pushCharStream(LEXER, str)
#define POPSTREAM()   LEXER->popCharStream(LEXER)
#define SETTEXT(str)   LEXSTATE->text = str
#define SKIP()   LEXSTATE->token = &(TOKSOURCE->skipToken)
#define USER1   LEXSTATE->user1
#define USER2   LEXSTATE->user2
#define USER3   LEXSTATE->user3
#define CUSTOM   LEXSTATE->custom
#define RULEMEMO   LEXSTATE->ruleMemo
#define DBG   RECOGNIZER->debugger

/* If we have been told we can rely on the standard 8 bit or UTF16 input
 * stream, then we can define our macros to use the direct pointers
 * in the input object, which is much faster than indirect calls. This
 * is really only significant to lexers with a lot of fragment rules (which
 * do not place LA(1) in a temporary at the moment) and even then
 * only if there is a lot of input (order of say 1M or so).
 */
#if defined(ANTLR3_INLINE_INPUT_8BIT) || defined(ANTLR3_INLINE_INPUT_UTF16)

# ifdef ANTLR3_INLINE_INPUT_8BIT

/* 8 bit character set */

# define   NEXTCHAR ((pANTLR3_UINT8)(INPUT->nextChar))
# define   DATAP ((pANTLR3_UINT8)(INPUT->data))

# else

# define   NEXTCHAR ((pANTLR3_UINT16)(INPUT->nextChar))
# define   DATAP ((pANTLR3_UINT16)(INPUT->data))

# endif

# define   LA(n) ((NEXTCHAR + n) > (DATAP + INPUT->sizeBuf) ? ANTLR3_CHARSTREAM_EOF :
(ANTLR3_UCHAR)(*(NEXTCHAR + n - 1)))
# define       CONSUME()                               \\
{                                                   \\
  if     (NEXTCHAR \< (DATAP + INPUT->sizeBuf))                  \\
```

```
  {                                                  \\
    INPUT->charPositionInLine++;                          \\
    if ((ANTLR3_UCHAR)(*NEXTCHAR) == INPUT->newlineChar)      \\
    {                                                \\
      INPUT->line++;                                 \\
      INPUT->charPositionInLine      = 0;               \\
      INPUT->currentLine           = (void *)(NEXTCHAR + 1); \\
    }                                              \\
    INPUT->nextChar = (void *)(NEXTCHAR + 1);             \\
  }                                                \\
}

#else

// Pick up the input character by calling the input stream implementation.
//
#define   CONSUME()   INPUT->istream->consume(INPUT->istream)
#define   LA(n)       INPUT->istream->_LA(INPUT->istream, n)

#endif
<endif>

<if(PARSER)>
/* Macros for accessing things in the parser
*/

#undef    PARSER
#undef    RECOGNIZER
#undef    HAVEPARSEDRULE
#undef  MEMOIZE
#undef    INPUT
#undef    STRSTREAM
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    MATCHT
#undef    MATCHANYT
#undef    FOLLOWSTACK
#undef    FOLLOWPUSH
#undef    FOLLOWPOP
#undef    PRECOVER
#undef    PREPORTERROR
#undef    LA
#undef    LT
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
```

```c
#undef    PERRORRECOVERY
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    RECOVERFROMMISMATCHEDSET
#undef    RECOVERFROMMISMATCHEDELEMENT
#undef INDEX
#undef    ADAPTOR
#undef SEEK
#undef    RULEMEMO
#undef DBG


#define    PARSER   ctx->pParser
#define    RECOGNIZER   PARSER->rec
#define    PSRSTATE   RECOGNIZER->state
#define    HAVEPARSEDRULE(r)  RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define    MEMOIZE(ri,si)  RECOGNIZER->memoize(RECOGNIZER, ri, si)
#define    INPUT   PARSER->tstream
#define    STRSTREAM   INPUT
#define    ISTREAM   INPUT->istream
#define    INDEX()   ISTREAM->index(INPUT->istream)
#define    HASEXCEPTION()  (PSRSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION   PSRSTATE->exception
#define    MATCHT(t, fs)  RECOGNIZER->match(RECOGNIZER, t, fs)
#define    MATCHANYT()   RECOGNIZER->matchAny(RECOGNIZER)
#define    FOLLOWSTACK   PSRSTATE->following
#ifdef SKIP_FOLLOW_SETS
#define    FOLLOWPUSH(x)
#define    FOLLOWPOP()
#else
#define    FOLLOWPUSH(x)  FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define    FOLLOWPOP()   FOLLOWSTACK->pop(FOLLOWSTACK)
#endif
#define    PRECOVER()   RECOGNIZER->recover(RECOGNIZER)
#define    PREPORTERROR()   RECOGNIZER->reportError(RECOGNIZER)
#define    LA(n)   INPUT->istream->_LA(ISTREAM, n)
#define    LT(n)   INPUT->_LT(INPUT, n)
#define    CONSTRUCTEX()   RECOGNIZER->exConstruct(RECOGNIZER)
#define    CONSUME()   ISTREAM->consume(ISTREAM)
#define    MARK()   ISTREAM->mark(ISTREAM)
#define    REWIND(m)   ISTREAM->rewind(ISTREAM, m)
#define    REWINDLAST()   ISTREAM->rewindLast(ISTREAM)
#define    SEEK(n)   ISTREAM->seek(ISTREAM, n)
#define    PERRORRECOVERY   PSRSTATE->errorRecovery
#define    FAILEDFLAG   PSRSTATE->failed
#define    HASFAILED()   (FAILEDFLAG == ANTLR3_TRUE)
#define    BACKTRACKING   PSRSTATE->backtracking
#define    RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER, s)
```

```
#define    RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define    ADAPTOR                ctx->adaptor
#define RULEMEMO      PSRSTATE->ruleMemo
#define DBG        RECOGNIZER->debugger

<endif>

<if(TREE_PARSER)>
/* Macros for accessing things in the parser
*/

#undef    PARSER
#undef    RECOGNIZER
#undef    HAVEPARSEDRULE
#undef    INPUT
#undef    STRSTREAM
#undef    HASEXCEPTION
#undef    EXCEPTION
#undef    MATCHT
#undef    MATCHANYT
#undef    FOLLOWSTACK
#undef    FOLLOWPUSH
#undef    FOLLOWPOP
#undef    PRECOVER
#undef    PREPORTERROR
#undef    LA
#undef    LT
#undef    CONSTRUCTEX
#undef    CONSUME
#undef    MARK
#undef    REWIND
#undef    REWINDLAST
#undef    PERRORRECOVERY
#undef    HASFAILED
#undef    FAILEDFLAG
#undef    RECOVERFROMMISMATCHEDSET
#undef    RECOVERFROMMISMATCHEDELEMENT
#undef    BACKTRACKING
#undef     ADAPTOR
#undef    RULEMEMO
#undef  SEEK
#undef  INDEX
#undef  DBG

#define    PARSER      ctx->pTreeParser
#define    RECOGNIZER    PARSER->rec
#define PSRSTATE    RECOGNIZER->state
```

```
#define    HAVEPARSEDRULE(r)    RECOGNIZER->alreadyParsedRule(RECOGNIZER, r)
#define    INPUT    PARSER->ctnstream
#define ISTREAM    INPUT->tnstream->istream
#define    STRSTREAM    INPUT->tnstream
#define    HASEXCEPTION()    (PSRSTATE->error == ANTLR3_TRUE)
#define    EXCEPTION    PSRSTATE->exception
#define    MATCHT(t, fs)    RECOGNIZER->match(RECOGNIZER, t, fs)
#define    MATCHANYT()    RECOGNIZER->matchAny(RECOGNIZER)
#define    FOLLOWSTACK    PSRSTATE->following
#define    FOLLOWPUSH(x)    FOLLOWSTACK->push(FOLLOWSTACK, ((void *)(&(x))), NULL)
#define    FOLLOWPOP()    FOLLOWSTACK->pop(FOLLOWSTACK)
#define    PRECOVER()    RECOGNIZER->recover(RECOGNIZER)
#define    PREPORTERROR()    RECOGNIZER->reportError(RECOGNIZER)
#define    LA(n)    ISTREAM->_LA(ISTREAM, n)
#define    LT(n)    INPUT->tnstream->_LT(INPUT->tnstream, n)
#define    CONSTRUCTEX()    RECOGNIZER->exConstruct(RECOGNIZER)
#define    CONSUME()    ISTREAM->consume(ISTREAM)
#define    MARK()    ISTREAM->mark(ISTREAM)
#define    REWIND(m)    ISTREAM->rewind(ISTREAM, m)
#define    REWINDLAST()    ISTREAM->rewindLast(ISTREAM)
#define    PERRORRECOVERY    PSRSTATE->errorRecovery
#define    FAILEDFLAG    PSRSTATE->failed
#define    HASFAILED()    (FAILEDFLAG == ANTLR3_TRUE)
#define    BACKTRACKING    PSRSTATE->backtracking
#define    RECOVERFROMMISMATCHEDSET(s)  RECOGNIZER->recoverFromMismatchedSet(RECOGNIZER,
s)
#define    RECOVERFROMMISMATCHEDELEMENT(e) RECOGNIZER-
>recoverFromMismatchedElement(RECOGNIZER, s)
#define    ADAPTOR                INPUT->adaptor
#define RULEMEMO    PSRSTATE->ruleMemo
#define SEEK(n)    ISTREAM->seek(ISTREAM, n)
#define INDEX()    ISTREAM->index(ISTREAM)
#define DBG    RECOGNIZER->debugger


<endif>


#define  TOKTEXT(tok, txt)    tok, (pANTLR3_UINT8)txt

/* The 4 tokens defined below may well clash with your own #defines or token types. If so
 * then for the present you must use different names for your defines as these are hard coded
 * in the code generator. It would be better not to use such names internally, and maybe
 * we can change this in a forthcoming release. I deliberately do not #undef these
 * here as this will at least give you a redefined error somewhere if they clash.
 */
#define    UP    ANTLR3_TOKEN_UP
#define    DOWN   ANTLR3_TOKEN_DOWN
#define    EOR    ANTLR3_TOKEN_EOR
```

```
#define   INVALID ANTLR3_TOKEN_INVALID


/* =============================================================================
 * Functions to create and destroy scopes. First come the rule scopes, followed
 * by the global declared scopes.
 */

<rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncDecl(scope=r.ruleDescriptor.ruleScope)>
<ruleAttributeScopeFuncs(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<recognizer.scopes:{it | <if(it.isDynamicGlobalScope)>
<globalAttributeScopeFuncDecl(it)>
<globalAttributeScopeFuncs(it)>
<endif>}>

/* ============================================================================= */

/* =============================================================================
 * Start of recognizer
 */

<recognizer>

/* End of code
 * =============================================================================
 */

>>
headerFileExtension() ::= ".h"

headerFile( LEXER,
        PARSER,
        TREE_PARSER,
        actionScope,
        actions,
        docComment,
        recognizer,
        name,
        tokens,
        tokenNames,
        rules,
        cyclicDFAs,
        bitsets,
        buildTemplate,
        buildAST,
```

```
        rewriteMode,
        profile,
        backtracking,
        synpreds,
        memoize,
        numRules,
        fileName,
        ANTLRVersion,
        generatedTimestamp,
        trace,
        scopes,
    superClass,
        literals
      ) ::=
<<
<leadIn("C header")>
<if(PARSER)>
* The parser <mainName()>
<endif>
<if(LEXER)>
* The lexer <mainName()>
<endif>
<if(TREE_PARSER)>
* The tree parser <mainName()>
<endif>
has the callable functions (rules) shown below,
* which will invoke the code for the associated rule in the source grammar
* assuming that the input stream is pointing to a token/text stream that could begin
* this rule.
*
* For instance if you call the first (topmost) rule in a parser grammar, you will
* get the results of a full parse, but calling a rule half way through the grammar will
* allow you to pass part of a full token stream to the parser, such as for syntax checking
* in editors and so on.
*
* The parser entry points are called indirectly (by function pointer to function) via
* a parser context typedef p<name>, which is returned from a call to <name>New().
*
<if(LEXER)>
* As this is a generated lexer, it is unlikely you will call it 'manually'. However
* the methods are provided anyway.
*
<endif>
* The methods in p<name> are  as follows:
*
* <rules:{r | <if(!r.ruleDescriptor.isSynPred)> - <headerReturnType(ruleDescriptor=r.ruleDescriptor,...)>
p<name>-><r.ruleDescriptor.name>(p<name>)<endif>}; separator="\n * ">
*
```

```
* The return type for any particular rule is of course determined by the source
* grammar file.
*/
```

```
#ifndef _<name>_H
#define _<name>_H
<actions.(actionScope).preincludes>
/* =============================================================================
 * Standard antlr3 C runtime definitions
 */
#include    \<antlr3.h>

/* End of standard antlr 3 runtime definitions
 * =============================================================================
 */
<actions.(actionScope).includes>

#ifdef __cplusplus
extern "C" {
#endif
```

// Forward declare the context typedef so that we can use it before it is
// properly defined. Delegators and delegates (from import statements) are
// interdependent and their context structures contain pointers to each other
// C only allows such things to be declared if you pre-declare the typedef.
//
typedef struct <name>_Ctx_struct <name>, * p<name>;

<if(recognizer.grammar.delegates)>
// Include delegate definition header files
//
<recognizer.grammar.delegates: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>

<actions.(actionScope).header>

#ifdef ANTLR3_WINDOWS
// Disable: Unreferenced parameter,   - Rules with parameters that are not used
//   constant conditional,   - ANTLR realizes that a prediction is always true (synpred usually)
//   initialized but unused variable   - tree rewrite variables declared but not needed
//   Unreferenced local variable   - lexer rule declares but does not always use _type
//   potentially unitialized variable used   - retval always returned from a rule
//   unreferenced local function has been removed - susually getTokenNames or freeScope, they can go without warnigns
//
// These are only really displayed at warning level /W4 but that is the code ideal I am aiming at
// and the codegen must generate some of these warnings by necessity, apart from 4100, which is
// usually generated when a parser rule is given a parameter that it does not use. Mostly though
// this is a matter of orthogonality hence I disable that one.
//
#pragma warning(disable : 4100)
#pragma warning(disable : 4101)
#pragma warning(disable : 4127)
#pragma warning(disable : 4189)
#pragma warning(disable : 4505)
#pragma warning(disable : 4701)
#endif
<if(backtracking)>

/* =======================
* BACKTRACKING IS ENABLED
* =======================
*/
<endif>

<rules:{r |<headerReturnScope(ruleDescriptor=r.ruleDescriptor,...)>}>

```
<scopes:{it | <if(it.isDynamicGlobalScope)><globalAttributeScopeDecl(it)><endif>}>
<rules:{r |<ruleAttributeScopeDecl(scope=r.ruleDescriptor.ruleScope)>}>
<if(recognizer.grammar.delegators)>
// Include delegator definition header files
//
<recognizer.grammar.delegators: {g|#include \<<g.recognizerName>.h>}; separator="\n">

<endif>

/** Context tracking structure for <mainName()>
*/
struct <name>_Ctx_struct
{
   /** Built in ANTLR3 context tracker contains all the generic elements
    * required for context tracking.
    */
<if(PARSER)>
   pANTLR3_PARSER   pParser;
<endif>
<if(LEXER)>
   pANTLR3_LEXER   pLexer;
<endif>
<if(TREE_PARSER)>
   pANTLR3_TREE_PARSER    pTreeParser;
<endif>

<if(recognizer.grammar.delegates)>
 <recognizer.grammar.delegates:
     {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(recognizer.grammar.delegators)>
 <recognizer.grammar.delegators:
     {g|p<g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<scopes:{it | <if(it.isDynamicGlobalScope)>
   <globalAttributeScopeDef(it)>
<endif>}; separator="\n\n">
<rules: {r |<if(r.ruleDescriptor.ruleScope)>
   <ruleAttributeScopeDef(scope=r.ruleDescriptor.ruleScope)>
<endif>}>

<if(LEXER)>
   <rules:{r | <if(!r.ruleDescriptor.isSynPred)><headerReturnType(ruleDescriptor=r.ruleDescriptor)>
(*m<r.ruleDescriptor.name>) (struct <name>_Ctx_struct * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);<endif>}; separator="\n">
<endif>
<if(!LEXER)>
```

```
  <rules:{r | <headerReturnType(ruleDescriptor=r.ruleDescriptor)> (*<r.ruleDescriptor.name>) (struct
<name>_Ctx_struct * ctx<if(r.ruleDescriptor.parameterScope)>,
<endif><r.ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
  // Delegated rules
<recognizer.grammar.delegatedRules:{ruleDescriptor|
  <headerReturnType(ruleDescriptor)> (*<ruleDescriptor.name>)(struct <name>_Ctx_struct *
ctx<if(ruleDescriptor.parameterScope)>, <endif><ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
<endif>

  const char * (*getGrammarFileName)();
  void       (*reset) (struct <name>_Ctx_struct * ctx);
  void    (*free)  (struct <name>_Ctx_struct * ctx);
  <@members>
  <@end>
  <actions.(actionScope).context>
};


// Function protoypes for the constructor functions that external translation units
// such as delegators and delegates may wish to call.
//
ANTLR3_API p<name> <name>New        (<inputType()> instream<recognizer.grammar.delegators:{g|,
p<g.recognizerName> <g:delegateName()>}>);
ANTLR3_API p<name> <name>NewSSD      (<inputType()> instream,
pANTLR3_RECOGNIZER_SHARED_STATE state<recognizer.grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>);
<if(!recognizer.grammar.grammarIsRoot)>
extern pANTLR3_UINT8   <recognizer.grammar.composite.rootGrammar.recognizerName>TokenNames[];
<endif>


/** Symbolic definitions of all the tokens that the <grammarType()> will work with.
 * \{
 *
 * Antlr will define EOF, but we can't use that as it it is too common in
 * in C header files and that would be confusing. There is no way to filter this out at the moment
 * so we just undef it here for now. That isn't the value we get back from C recognizers
 * anyway. We are looking for ANTLR3_TOKEN_EOF.
 */
#ifdef EOF
#undef EOF
#endif
#ifdef Tokens
#undef Tokens
#endif
<tokens:{it | #define <it.name>      <it.type>}; separator="\n">
```

```
#ifdef EOF
#undef EOF
#define EOF ANTLR3_TOKEN_EOF
#endif

#ifndef TOKENSOURCE
#define TOKENSOURCE(lxr) lxr->pLexer->rec->state->tokSource
#endif

/* End of token definitions for <name>
 * =============================================================================
 */
/** \} */

#ifdef __cplusplus
}
#endif

#endif

/* END - Note:Keep extra line feed to satisfy UNIX systems */

>>

inputType() ::=<<
<if(LEXER)>
pANTLR3_INPUT_STREAM
<endif>
<if(PARSER)>
pANTLR3_COMMON_TOKEN_STREAM
<endif>
<if(TREE_PARSER)>
pANTLR3_COMMON_TREE_NODE_STREAM
<endif>
>>

grammarType() ::= <<
<if(PARSER)>
parser
<endif>
<if(LEXER)>
lexer
<endif>
<if(TREE_PARSER)>
tree parser
<endif>
>>
```

```
mainName() ::= <<
<if(PARSER)>
<name>
<endif>
<if(LEXER)>
<name>
<endif>
<if(TREE_PARSER)>
<name>
<endif>
>>

headerReturnScope(ruleDescriptor) ::= "<returnScope(...)>"

headerReturnType(ruleDescriptor) ::= <<
<if(LEXER)>
<if(!ruleDescriptor.isSynPred)>
void
<else>
<returnType()>
<endif>
<else>
<returnType()>
<endif>
>>

// Produce the lexer output
//
lexer(  grammar,
  name,
      tokens,
      scopes,
      rules,
      numRules,
      filterMode,
      superClass,
      labelType="pANTLR3_COMMON_TOKEN") ::= <<

<if(filterMode)>
/* Forward declare implementation function for ANTLR3_TOKEN_SOURCE interface when
 * this is a filter mode lexer.
 */
static pANTLR3_COMMON_TOKEN <name>NextToken   (pANTLR3_TOKEN_SOURCE toksource);

/* Override the normal MEMOIZE and HAVEALREADYPARSED macros as this is a filtering
 * lexer. In filter mode, the memoizing and backtracking are gated at BACKTRACKING > 1 rather
 * than just BACKTRACKING. In some cases this might generate code akin to:
 *   if (BACKTRACKING) if (BACKTRACKING > 1) memoize.
```

```
 * However, I assume that the C compilers/optimizers are smart enough to work this one out
 * these days - Jim
 */
#undef  MEMOIZE
#define  MEMOIZE(ri,si)  if (BACKTRACKING>1) { RECOGNIZER->memoize(RECOGNIZER, ri, si) }
#undef  HAVEPARSEDRULE
#define  HAVEPARSEDRULE(r)  if (BACKTRACKING>1) { RECOGNIZER->alreadyParsedRule(RECOGNIZER,
r) }
<endif>

/* Forward declare the locally static matching functions we have generated and any predicate functions.
*/
<rules:{r | static ANTLR3_INLINE <headerReturnType(ruleDescriptor=r.ruleDescriptor)>
<if(!r.ruleDescriptor.isSynPred)>m<endif><r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);

/* =======================================================================
* Lexer matching rules end.
* =======================================================================
*/

<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScope(it)><endif>}>

<actions.lexer.members>

static void
<name>Free  (p<name> ctx)
{
<if(memoize)>
 if (RULEMEMO != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<if(grammar.directDelegates)>
 // Free the lexers that we delegated to
 // functions to. NULL the state so we only free it once.
 //
 <grammar.directDelegates:
     {g|ctx-><g:delegateName()>->pLexer->rec->state = NULL;
     ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
  LEXER->free(LEXER);

  ANTLR3_FREE(ctx);
```

```
}

static void
<name>Reset (p<name> ctx)
{
   RECOGNIZER->reset(RECOGNIZER);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
}

<if(filterMode)>
   <filteringNextToken()>
<endif>

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>New
(<inputType()> instream<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
 // See if we can create a new lexer with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new lexer called <name>
*
* \param[in]    instream Pointer to an initialized input stream
* \param[state] state Previously created shared recognizer stat
* \return
*     - Success p<name> initialized for the lex start
*     - Fail NULL
*/
ANTLR3_API p<name> <name>NewSSD
(pANTLR3_INPUT_STREAM instream, pANTLR3_RECOGNIZER_SHARED_STATE
```

```
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
    p<name> ctx; // Context structure we will build and return

    ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

    if  (ctx == NULL)
    {
        // Failed to allocate memory for lexer context
        return  NULL;
    }

    /* -----------------------------------------------------------------
     * Memory for basic structure is allocated, now to fill in
     * in base ANTLR3 structures. We initialize the function pointers
     * for the standard ANTLR3 lexer function set, but upon return
     * from here, the programmer may set the pointers to provide custom
     * implementations of each function.
     *
     * We don't use the macros defined in <name>.h here so you can get a sense
     * of what goes where.
     */

    /* Create a base lexer, using the supplied input stream
     */
    ctx->pLexer = antlr3LexerNewStream(ANTLR3_SIZE_HINT, instream, state);

    /* Check that we allocated the memory correctly
     */
    if (ctx->pLexer == NULL)
    {
    ANTLR3_FREE(ctx);
    return  NULL;
    }
<if(memoize)>
<if(grammar.grammarIsRoot)>
    // Create a LIST for recording rule memos.
    //
    ctx->pLexer->rec->ruleMemo    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */
<endif>
<endif>

    /* Install the implementation of our <name> interface
     */
    <rules:{r | <if(!r.ruleDescriptor.isSynPred)>ctx->m<r.ruleDescriptor.name> =
m<r.ruleDescriptor.name>;<endif>}; separator="\n">

    /** When the nextToken() call is made to this lexer's pANTLR3_TOKEN_SOURCE
```

```
    *  it will call mTokens() in this generated code, and will pass it the ctx
    * pointer of this lexer, not the context of the base lexer, so store that now.
    */
   ctx->pLexer->ctx    = ctx;

   /**Install the token matching function
    */
   ctx->pLexer->mTokens = (void (*) (void *))(mTokens);

   ctx->getGrammarFileName = getGrammarFileName;
   ctx->free  = <name>Free;
   ctx->reset         = <name>Reset;

<if(grammar.directDelegates)>
 // Initialize the lexers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
     {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, ctx->pLexer->rec->state,
ctx<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to lexers that will delegate us to perform certain functions
 // for them.
 //
 <grammar.delegators:
     {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
<if(filterMode)>
   /* We have filter mode turned on, so install the filtering nextToken function
    */
   ctx->pLexer->rec->state->tokSource->nextToken = <name>NextToken;
<endif>
  <actions.lexer.apifuncs>

   /* Return the newly built lexer to the caller
    */
   return  ctx;
}
<if(cyclicDFAs)>

/* =========================================================================
 * DFA tables for the lexer
 */
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* =========================================================================
 * End of DFA tables for the lexer
 */
```

```
/* ========================================================================
 * Functions to match the lexer grammar defined tokens from the input stream
 */

<rules; separator="\n\n">

/* ========================================================================
 * Lexer matching rules end.
 * ========================================================================
 */
<if(synpreds)>

/* ========================================================================
 * Lexer syntactic predicates
 */
<synpreds:{p | <lexerSynpred(predname=p)>}>
/* ========================================================================
 * Lexer syntactic predicates end.
 * ========================================================================
 */
<endif>

/* End of Lexer code
 * ================================================
 * ================================================
 */

>>


filteringNextToken() ::= <<
/** An override of the lexer's nextToken() method that backtracks over mTokens() looking
 *  for matches in lexer filterMode.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  BACKTRACKING needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
 *  at BACKTRACKING==1.
 */
static pANTLR3_COMMON_TOKEN
<name>NextToken(pANTLR3_TOKEN_SOURCE toksource)
{
    pANTLR3_LEXER   lexer;
    pANTLR3_RECOGNIZER_SHARED_STATE state;

    lexer   = (pANTLR3_LEXER)(toksource->super);
    state = lexer->rec->state;
```

```c
/* Get rid of any previous token (token factory takes care of
 * any deallocation when this token is finally used up.
 */
state ->token    = NULL;
state ->error    = ANTLR3_FALSE;    /* Start out without an exception */
state ->failed   = ANTLR3_FALSE;

/* Record the start of the token in our input stream.
 */
state->tokenStartCharIndex   = lexer->input->istream->index(lexer->input->istream);
state->tokenStartCharPositionInLine = lexer->input->getCharPositionInLine(lexer->input);
state->tokenStartLine    = lexer->input->getLine(lexer->input);
state->text       = NULL;

/* Now call the matching rules and see if we can generate a new token
 */
for (;;)
{
if  (lexer->input->istream->_LA(lexer->input->istream, 1) == ANTLR3_CHARSTREAM_EOF)
{
/* Reached the end of the stream, nothing more to do.
 */
pANTLR3_COMMON_TOKEN    teof = &(toksource->eofToken);

teof->setStartIndex (teof, lexer->getCharIndex(lexer));
teof->setStopIndex  (teof, lexer->getCharIndex(lexer));
teof->setLine  (teof, lexer->getLine(lexer));
return  teof;
}

state->token  = NULL;
state->error  = ANTLR3_FALSE;    /* Start out without an exception */

{
ANTLR3_MARKER   m;

m     = lexer->input->istream->mark(lexer->input->istream);
state->backtracking  = 1;   /* No exceptions */
state->failed   = ANTLR3_FALSE;

/* Call the generated lexer, see if it can get a new token together.
 */
lexer->mTokens(lexer->ctx);
 state->backtracking = 0;

 <! mTokens backtracks with synpred at BACKTRACKING==2
 and we set the synpredgate to allow actions at level 1. !>
```

```
  if (state->failed == ANTLR3_TRUE)
  {
   lexer->input->istream->rewind(lexer->input->istream, m);
   lexer->input->istream->consume(lexer->input->istream); <! advance one char and try again !>
  }
  else
  {
   lexer->emit(lexer);     /* Assemble the token and emit it to the stream */
   return state->token;
  }
 }
 }
}
>>


actionGate() ::= "BACKTRACKING==0"


filteringActionGate() ::= "BACKTRACKING==1"


/** How to generate a parser */
genericParser(  grammar,
   name,
          scopes,
          tokens,
          tokenNames,
          rules,
          numRules,
          bitsets,
          inputStreamType,
          superClass,
          labelType,
   members,
   rewriteElementType, filterMode,
          ASTLabelType="pANTLR3_BASE_TREE"
          ) ::= <<



<if(grammar.grammarIsRoot)>
/** \brief Table of all token names in symbolic order, mainly used for
*       error reporting.
*/
pANTLR3_UINT8   <name>TokenNames[<length(tokenNames)>+4]
   = {
      (pANTLR3_UINT8) "\<invalid>",      /* String to print to indicate an invalid token */
      (pANTLR3_UINT8) "\<EOR>",
      (pANTLR3_UINT8) "\<DOWN>",
      (pANTLR3_UINT8) "\<UP>",
      <tokenNames:{it |(pANTLR3_UINT8) <it>}; separator=",\n">
```

```
    };
<endif>

  <@members>

  <@end>
<rules:{r |<ruleAttributeScopeFuncMacro(scope=r.ruleDescriptor.ruleScope)>}>
<scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFuncMacro(it)><endif>}>

// Forward declare the locally static matching functions we have generated.
//
<rules:{r | static <headerReturnType(ruleDescriptor=r.ruleDescriptor)> <r.ruleDescriptor.name>    (p<name>
ctx<if(r.ruleDescriptor.parameterScope)>, <endif><r.ruleDescriptor.parameterScope:parameterScope()>);};
separator="\n">
static void <name>Free(p<name> ctx);
static void     <name>Reset (p<name> ctx);

<if(!LEXER)>
<! generate rule/method definitions for imported rules so they
  appear to be defined in this recognizer. !>
<if(recognizer.grammar.delegatedRules)>
// Delegated rules
//
<recognizer.grammar.delegatedRules:{ruleDescriptor|static <headerReturnType(ruleDescriptor)>
<ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>);}; separator="\n">

<endif>
<endif>

/* For use in tree output where we are accumulating rule labels via label += ruleRef
* we need a function that knows how to free a return scope when the list is destroyed.
* We cannot just use ANTLR3_FREE because in debug tracking mode, this is a macro.
*/
static void ANTLR3_CDECL freeScope(void * scope)
{
  ANTLR3_FREE(scope);
}

/** \brief Name of the grammar file that generated this code
*/
static const char fileName[] = "<fileName>";

/** \brief Return the name of the grammar file that generated this code.
*/
static const char * getGrammarFileName()
{
 return fileName;
```

```
}
/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>New   (<inputStreamType> instream<grammar.delegators:{g|, p<g.recognizerName>
<g:delegateName()>}>)
{
 // See if we can create a new parser with the standard constructor
 //
 return <name>NewSSD(instream, NULL<grammar.delegators:{g|, <g:delegateName()>}>);
}

/** \brief Create a new <name> parser and return a context for it.
*
* \param[in] instream Pointer to an input stream interface.
*
* \return Pointer to new parser context upon success.
*/
ANTLR3_API p<name>
<name>NewSSD   (<inputStreamType> instream, pANTLR3_RECOGNIZER_SHARED_STATE
state<grammar.delegators:{g|, p<g.recognizerName> <g:delegateName()>}>)
{
  p<name> ctx;    /* Context structure we will build and return   */

  ctx = (p<name>) ANTLR3_CALLOC(1, sizeof(<name>));

  if (ctx == NULL)
  {
 // Failed to allocate memory for parser context
 //
     return  NULL;
  }

  /* -----------------------------------------------------------------
   * Memory for basic structure is allocated, now to fill in
   * the base ANTLR3 structures. We initialize the function pointers
   * for the standard ANTLR3 parser function set, but upon return
   * from here, the programmer may set the pointers to provide custom
   * implementations of each function.
   *
   * We don't use the macros defined in <name>.h here, in order that you can get a sense
   * of what goes where.
   */
```

```
<if(PARSER)>
   /* Create a base parser/recognizer, using the supplied token stream
    */
   ctx->pParser     = antlr3ParserNewStream(ANTLR3_SIZE_HINT, instream->tstream, state);
<endif>
<if(TREE_PARSER)>
   /* Create a base Tree parser/recognizer, using the supplied tree node stream
    */
   ctx->pTreeParser  = antlr3TreeParserNewStream(ANTLR3_SIZE_HINT, instream, state);
<endif>

   /* Install the implementation of our <name> interface
    */
   <rules:{r | ctx-><r.ruleDescriptor.name> = <r.ruleDescriptor.name>;}; separator="\n">
<if(grammar.delegatedRules)>
 // Install the delegated methods so that they appear to be a part of this
 // parser
 //
   <grammar.delegatedRules:{ruleDescriptor | ctx-><ruleDescriptor.name> = <ruleDescriptor.name>;};
separator="\n">
<endif>

   ctx->free   = <name>Free;
   ctx->reset   = <name>Reset;
   ctx->getGrammarFileName = getGrammarFileName;

   /* Install the scope pushing methods.
    */
   <rules: {r |<if(r.ruleDescriptor.ruleScope)>
<ruleAttributeScope(scope=r.ruleDescriptor.ruleScope)><\n>
<endif>}>
   <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)>
<globalAttributeScope(it)><\n>
<endif>}>
   <@apifuncs>

   <@end>
<if(grammar.directDelegates)>
 // Initialize the parsers that we are going to delegate some
 // functions to.
 //
 <grammar.directDelegates:
     {g|ctx-><g:delegateName()> = <g.recognizerName>NewSSD(instream, PSRSTATE,
ctx<grammar.delegators:{g|, <g:delegateName()>}>);}; separator="\n">
<endif>
<if(grammar.delegators)>
 // Install the pointers back to parsers that will delegate us to perform certain functions
 // for them.
```

```
 //
 <grammar.delegators:
       {g|ctx-><g:delegateName()>   = <g:delegateName()>;}; separator="\n">
<endif>
  <actions.parser.apifuncs>
  <actions.treeparser.apifuncs>
<if(memoize)>
<if(grammar.grammarIsRoot)>
  /* Create a LIST for recording rule memos.
   */
   RULEMEMO    = antlr3IntTrieNew(15); /* 16 bit depth is enough for 32768 rules! */<\n>
<endif>
<endif>
  /* Install the token table
   */
  PSRSTATE->tokenNames   = <grammar.composite.rootGrammar.recognizerName>TokenNames;

  <@debugStuff()>

  /* Return the newly built parser to the caller
   */
  return  ctx;
}

static void
<name>Reset (p<name> ctx)
{
  RECOGNIZER->reset(RECOGNIZER);
}

/** Free the parser resources
*/
static void
<name>Free(p<name> ctx)
{
  /* Free any scope memory
   */
  <rules: {r
|<if(r.ruleDescriptor.ruleScope)><ruleAttributeScopeFree(scope=r.ruleDescriptor.ruleScope)><\n><endif>}>
  <recognizer.scopes:{it |<if(it.isDynamicGlobalScope)><globalAttributeScopeFree(it)><\n><endif>}>

  <@cleanup>
  <@end>
<if(grammar.directDelegates)>
 // Free the parsers that we delegated to
 // functions to.NULL the state so we only free it once.
 //
 <grammar.directDelegates:
```

```
    {g| ctx-><g:delegateName()>-><if(TREE_PARSER)>pTreeParser<else>pParser<endif>->rec->state = NULL;
    ctx-><g:delegateName()>->free(ctx-><g:delegateName()>);}; separator="\n">
<endif>
<if(memoize)>
<if(grammar.grammarIsRoot)>
 if (RULEMEMO != NULL)
 {
  RULEMEMO->free(RULEMEMO);
  RULEMEMO = NULL;
 }
<endif>
<endif>
 // Free this parser
 //
<if(TREE_PARSER)>
   ctx->pTreeParser->free(ctx->pTreeParser);<\n>
<else>
   ctx->pParser->free(ctx->pParser);<\n>
<endif>

   ANTLR3_FREE(ctx);

   /* Everything is released, so we can return
    */
   return;
}

/** Return token names used by this <grammarType()>
 *
 * The returned pointer is used as an index into the token names table (using the token
 * number as the index).
 *
 * \return Pointer to first char * in the table.
 */
static pANTLR3_UINT8    *getTokenNames()
{
    return <grammar.composite.rootGrammar.recognizerName>TokenNames;
}

  <members>

/* Declare the bitsets
*/
<bitsets:{it | <bitsetDeclare(name={FOLLOW_<it.name>_in_<it.inName><it.tokenIndex>},
            words64=it.bits)>}>


<if(cyclicDFAs)>
```

```
/* ==================================================================================
 * DFA tables for the parser
 */
<cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
/* ==================================================================================
 * End of DFA tables for the parser
 */
<endif>


/* =============================================
 * Parsing rules
 */
<rules; separator="\n\n">
<if(grammar.delegatedRules)>
 // Delegated methods that appear to be a part of this
 // parser
 //
<grammar.delegatedRules:{ruleDescriptor|
   <returnType()> <ruleDescriptor.name>(p<name> ctx<if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
  \{
     <if(ruleDescriptor.hasReturnValue)>return <endif>ctx-><ruleDescriptor.grammar:delegateName()>-
><ruleDescriptor.name>(ctx-
><ruleDescriptor.grammar:delegateName()><if(ruleDescriptor.parameterScope.attributes)>,
<endif><ruleDescriptor.parameterScope.attributes:{a|<a.name>}; separator=", ">);
 \}}; separator="\n">

<endif>
/* End of parsing rules
 * =============================================
 */


/* =============================================
 * Syntactic predicates
 */
<synpreds:{p | <synpred(predname=p)>}>
/* End of syntactic predicates
 * =============================================
 */




>>

parser( grammar,
```

```
    name,
    scopes,
    tokens,
    tokenNames,
    rules,
    numRules,
    bitsets,
    ASTLabelType,
    superClass="Parser",
    labelType="pANTLR3_COMMON_TOKEN",
    members={<actions.parser.members>}
    ) ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TOKEN_STREAM", rewriteElementType="TOKEN",
...)>
>>


/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
 */
treeParser( grammar,
    name,
    scopes,
    tokens,
    tokenNames,
    globalAction,
    rules,
    numRules,
    bitsets,
    filterMode,
    labelType={<ASTLabelType>},
    ASTLabelType="pANTLR3_BASE_TREE",
    superClass="TreeParser",
    members={<actions.treeparser.members>}
    ) ::= <<
<genericParser(inputStreamType="pANTLR3_COMMON_TREE_NODE_STREAM",
rewriteElementType="NODE", ...)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 * rules created for syntactic predicates.  As they never have return values
 * nor parameters etc..., just give simplest possible method.  Don't do
 * any of the normal memoization stuff in here either; it's a waste.
 * As predicates cannot be inlined into the invoking rule, they need to
 * be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
// $ANTLR start <ruleName>
```

```
static void <ruleName>_fragment(p<name> ctx <ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 <ruleLabelInitializations()>
<if(trace)>
  ANTLR3_PRINTF("enter <ruleName> %d failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);
  <block>
  ANTLR3_PRINTF("exit <ruleName> %d, failed = %d, backtracking = %d\\n",LT(1),failed,BACKTRACKING);

<else>
  <block>
<endif>
<ruleCleanUp()>
}
// $ANTLR end <ruleName>
>>

synpred(predname) ::= <<
static ANTLR3_BOOLEAN <predname>(p<name> ctx)
{
  ANTLR3_MARKER   start;
  ANTLR3_BOOLEAN  success;

  BACKTRACKING++;
  <@start()>
  start = MARK();
  <predname>_fragment(ctx);     // can never throw exception
  success = !(FAILEDFLAG);
  REWIND(start);
  <@stop()>
  BACKTRACKING--;
  FAILEDFLAG = ANTLR3_FALSE;
  return success;
}<\n>
>>

lexerSynpred(predname) ::= <<
<synpred(predname)>
>>

ruleMemoization(rname) ::= <<
<if(memoize)>
if ( (BACKTRACKING>0) && (HAVEPARSEDRULE(<ruleDescriptor.index>)) )
{
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
 retval.start = 0;<\n>
<endif>
```

```
<endif>
  <(ruleDescriptor.actions.after):execAfter()>
  <finalCode(finalBlock=finally)>
<if(!ruleDescriptor.isSynPred)>
  <scopeClean()><\n>
<endif>
  return <ruleReturnValue()>;
}
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
if  (HASEXCEPTION())
{
  goto rule<ruleDescriptor.name>Ex;
}
<if(backtracking)>
if (HASFAILED())
{
  <scopeClean()>
  <@debugClean()>
  return <ruleReturnValue()>;
}
<endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>
if (BACKTRACKING>0)
{
  FAILEDFLAG = <true_value()>;
  <scopeClean()>
  return <ruleReturnValue()>;
}
<endif>
>>


/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
/**
 * $ANTLR start <ruleName>
 * <fileName>:<description>
 */
static <returnType()>
```

```
<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
    <if(trace)>ANTLR3_PRINTF("enter <ruleName> %s failed=%d, backtracking=%d\n", LT(1),
BACKTRACKING);<endif>
    <ruleDeclarations()>
    <ruleDescriptor.actions.declarations>
    <ruleLabelDefs()>
    <ruleInitializations()>
    <ruleDescriptor.actions.init>
    <ruleMemoization(rname=ruleName)>
    <ruleLabelInitializations()>
    <@preamble()>
    {
        <block>
    }

    <ruleCleanUp()>
<if(exceptions)>
    if (HASEXCEPTION())
    {
<exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
    }
    else
    {
<(ruleDescriptor.actions.after):execAfter()>
    }
<else>
    <if(!emptyRule)>
        <if(actions.(actionScope).rulecatch)>
            <actions.(actionScope).rulecatch>
        <else>
        if (HASEXCEPTION())
        {
            PREPORTERROR();
            PRECOVER();
            <@setErrorReturnValue()>
        }
        <if(ruleDescriptor.actions.after)>
        else
        {
            <(ruleDescriptor.actions.after):execAfter()>
        }<\n>
        <endif>
        <endif>
    <endif>
<endif>
```

```
  <if(trace)>ANTLR3_PRINTF("exit <ruleName> %d failed=%s backtracking=%s\n", LT(1), failed,
BACKTRACKING);<endif>
  <memoize()>
<if(finally)>
  <finalCode(finalBlock=finally)>
<endif>
  <scopeClean()>
  <@postamble()>
  return <ruleReturnValue()>;
}
/* $ANTLR end <ruleName> */
>>

finalCode(finalBlock) ::= <<
{
  <finalBlock>
}

>>

catch(decl,action) ::= <<
/* catch(decl,action)
*/
{
  <e.action>
}

>>

ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType()> retval;<\n>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name>;
}>
<endif>
<if(memoize)>
ANTLR3_MARKER <ruleDescriptor.name>_StartIndex;
<endif>
>>

ruleInitializations() ::= <<
/* Initialize rule variables
*/
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)>retval.<a.name> = <a.initValue>;<endif>
```

```
}>
<else>
<ruleDescriptor.returnScope.attributes:{ a |
<if(a.initValue)><a.name> = <a.initValue>;<endif>
}>
<endif>
<if(memoize)>
<ruleDescriptor.name>_StartIndex = INDEX();<\n>
<endif>
<ruleDescriptor.useScopes:{it |<scopeTop(it)> = <scopePush(it)>;}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopeTop(it.name)> = <scopePush(it.name)>;}; separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{it |<labelType>    <it.label.text>;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{it |pANTLR3_VECTOR    list_<it.label.text>;}; separator="\n"
>
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
  :ruleLabelDef(); separator="\n"
>
>>


ruleLabelInitializations() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels]
  :{it |<it.label.text>      = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,ruleDescriptor.ruleListLabels]
  :{it |list_<it.label.text>     = NULL;}; separator="\n"
>
<[ruleDescriptor.ruleLabels,ruleDescriptor.ruleListLabels]
  :ruleLabelInitVal(); separator="\n"
>
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!ruleDescriptor.isSynPred)>
retval.start = LT(1); retval.stop = retval.start;<\n>
<endif>
<endif>
>>


lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<labelType> <it.label.text>;}; separator="\n"
>
```

```
<ruleDescriptor.charLabels:{it |ANTLR3_UINT32 <it.label.text>;}; separator="\n">
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it |pANTLR3_INT_TRIE list_<it.label.text>;}; separator="\n"
>
>>


lexerRuleLabelInit() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it |list_<it.label.text> = antlr3IntTrieNew(31);}; separator="\n"
>
>>


lexerRuleLabelFree() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it |<it.label.text> = NULL;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels,
 ruleDescriptor.ruleListLabels]
  :{it |list_<it.label.text>->free(list_<it.label.text>);}; separator="\n"
>
>>


ruleReturnValue() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnName>
<else>
retval
<endif>
<endif>
<endif>
%>


memoize() ::= <<
<if(memoize)>
```

```
<if(backtracking)>
if ( BACKTRACKING>0 ) { MEMOIZE(<ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
<endif>
>>

ruleCleanUp() ::= <<

// This is where rules clean up and exit
//
goto rule<ruleDescriptor.name>Ex; /* Prevent compiler warnings */
rule<ruleDescriptor.name>Ex: ;
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
<if(!ruleDescriptor.isSynPred)>
retval.stop = LT(-1);<\n>
<endif>
<endif>
<endif>
>>

scopeClean() ::= <<
<ruleDescriptor.useScopes:{it |<scopePop(it)>}; separator="\n">
<ruleDescriptor.ruleScope:{it |<scopePop(it.name)>}; separator="\n">


>>
/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules, which do not produce tokens.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<
//   Comes from: <block.description>
/** \brief Lexer rule generated by ANTLR3
 *
 * $ANTLR start <ruleName>
 *
 * Looks to match the characters the constitute the token <ruleName>
 * from the attached input stream.
 *
 *
 * \remark
 *  - lexer->error == ANTLR3_TRUE if an exception was thrown.
 */
static ANTLR3_INLINE
void m<ruleName>(p<name> ctx<if(ruleDescriptor.parameterScope)>,
<endif><ruleDescriptor.parameterScope:parameterScope()>)
{
 ANTLR3_UINT32 _type;
   <ruleDeclarations()>
```

```
  <ruleDescriptor.actions.declarations>
  <lexerRuleLabelDefs()>
  <if(trace)>System.out.println("enter <ruleName> '"+(char)LA(1)+"'
line="+GETLINE()+":"+GETCHARPOSITIONINLINE()+" failed="+failed+"
backtracking="+BACKTRACKING);<endif>

<if(nakedBlock)>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  <ruleDescriptor.actions.init>

  <block><\n>
<else>
  <ruleMemoization(rname=ruleName)>
  <lexerRuleLabelInit()>
  _type    = <ruleName>;

  <ruleDescriptor.actions.init>

  <block>
 LEXSTATE->type = _type;
<endif>
  <if(trace)> ANTLR3_FPRINTF(stderr, "exit <ruleName> '%c' line=%d:%d failed = %d, backtracking
=%d\n",LA(1),GETLINE(),GETCHARPOSITIONINLINE(),failed,BACKTRACKING);<endif>
  <ruleCleanUp()>
  <lexerRuleLabelFree()>
  <(ruleDescriptor.actions.after):execAfter()>
  <memoize>
}
// $ANTLR end <ruleName>
>>

/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<
/** This is the entry point in to the lexer from an object that
 *  wants to generate the next token, such as a pCOMMON_TOKEN_STREAM
 */
static void
mTokens(p<name> ctx)
{
  <block><\n>

  goto ruleTokensEx; /* Prevent compiler warnings */
ruleTokensEx: ;
}
>>
```

// S U B R U L E S

```
/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<

// <fileName>:<description>
{
  int alt<decisionNumber>=<maxAlt>;
  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  <@prebranch()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
  }
  <@postbranch()>
}
>>

/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
{
  //  <fileName>:<description>

  ANTLR3_UINT32 alt<decisionNumber>;

  alt<decisionNumber>=<maxAlt>;

  <decls>
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
  }
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
```

```
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
{
    int cnt<decisionNumber>=0;
    <decls>
    <@preloop()>

    for (;;)
    {
        int alt<decisionNumber>=<maxAlt>;
<@predecision()>
<decision>
<@postdecision()>
switch (alt<decisionNumber>)
{
    <alts:{a | <altSwitchCase(i,a)>}>
    default:

  if ( cnt<decisionNumber> >= 1 )
  {
      goto loop<decisionNumber>;
  }
  <ruleBacktrackFailure()>
  <earlyExitEx()>
  <@earlyExitException()>
  goto rule<ruleDescriptor.name>Ex;
  }
 cnt<decisionNumber>++;
  }
  loop<decisionNumber>: ; /* Jump to here if this rule does not match */
  <@postloop()>
}
>>

earlyExitEx() ::= <<
```

```
/* mismatchedSetEx()
*/
CONSTRUCTEX();
EXCEPTION->type = ANTLR3_EARLY_EXIT_EXCEPTION;
EXCEPTION->name = (void *)ANTLR3_EARLY_EXIT_NAME;
<\n>
>>
positiveClosureBlockSingleAlt ::= positiveClosureBlock


/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<

// <fileName>:<description>
<decls>

<@preloop()>
for (;;)
{
  int alt<decisionNumber>=<maxAlt>;
  <@predecision()>
  <decision>
  <@postdecision()>
  switch (alt<decisionNumber>)
  {
<alts:{a | <altSwitchCase(i,a)>}>
default:
    goto loop<decisionNumber>; /* break out of the loop */
    break;
  }
}
loop<decisionNumber>: ; /* Jump out to here if this rule does not match */
<@postloop()>
>>

closureBlockSingleAlt ::= closureBlock


/** Optional blocks (x)? are translated to (x|) by antlr before code generation
*  so we can just use the normal block template
*/
optionalBlock ::= block


optionalBlockSingleAlt ::= block


/** A case in a switch that jumps to an alternative given the alternative
*  number.  A DFA predicts the alternative and then a simple switch
*  does the jump to the code that actually matches that alternative.
*/
```

```
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
  <@prealt()>
  <alt>
  break;<\n>
>>


/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
  <@declarations()>
  <@initializations()>
  <elements:element()>
  <rew>
  <@cleanup()>
}
>>


// E L E M E N T S
/** What to emit when there is no rewrite.  For auto build
 *  mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""


/** Dump the elements one per line */
element(e) ::= <<
<@prematch()>
<e.el><\n>
>>


/** match a token optionally with a label in front */
tokenRef(token,label,elementIndex,terminalOptions) ::= <<
<if(label)><label> = (<labelType>)<endif> MATCHT(<token>,
&FOLLOW_<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>


/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRef(...)>
<listLabel(elem=label,...)>
>>


listLabel(label,elem) ::= <<
if (list_<label> == NULL)
{
  list_<label>=ctx->vectors->newVector(ctx->vectors);
```

```
}
list_<label>->add(list_<label>, <elem>, NULL);
>>


/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHC(<char>);
<checkRuleBacktrackFailure()>
>>


/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHRANGE(<a>, <b>);
<checkRuleBacktrackFailure()>
>>


/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,terminalOptions,postmatchCode="") ::= <<
<if(label)>
<if(LEXER)>
<label>= LA(1);<\n>
<else>
<label>=(<labelType>)LT(1);<\n>
<endif>
<endif>
if ( <s> )
{
  CONSUME();
  <postmatchCode>
<if(!LEXER)>
  PERRORRECOVERY=ANTLR3_FALSE;
<endif>
  <if(backtracking)>FAILEDFLAG=ANTLR3_FALSE;<\n><endif>
}
else
{
  <ruleBacktrackFailure()>
  <mismatchedSetEx()>
  <@mismatchedSetException()>
<if(LEXER)>
  LRECOVER();
```

```
<else>
  RECOVERFROMMISMATCHEDSET(&FOLLOW_set_in_<ruleName><elementIndex>);
<endif>
  goto rule<ruleDescriptor.name>Ex;
}<\n>
>>


mismatchedSetEx() ::= <<
CONSTRUCTEX();
EXCEPTION->type        = ANTLR3_MISMATCHED_SET_EXCEPTION;
EXCEPTION->name        = (void *)ANTLR3_MISMATCHED_SET_NAME;
<if(PARSER)>
EXCEPTION->expectingSet = &FOLLOW_set_in_<ruleName><elementIndex>;
<endif>
>>


matchRuleBlockSet ::= matchSet


matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabel(elem=label,...)>
>>


/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <<
<if(label)>
<label>Start = GETCHARINDEX();
MATCHS(<string>);
<checkRuleBacktrackFailure()>
<label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
<label>->setType(<label>, ANTLR3_TOKEN_INVALID);
<label>->setStartIndex(<label>, <label>Start);
<label>->setStopIndex(<label>, GETCHARINDEX()-1);
<label>->input = INPUT->tnstream->istream;
<else>
MATCHS(<string>);
<checkRuleBacktrackFailure()><\n>
<endif>
>>


wildcard(token,label,elementIndex,terminalOptions) ::= <<
<if(label)>
<label>=(<labelType>)LT(1);<\n>
<endif>
MATCHANYT();
<checkRuleBacktrackFailure()>
>>
```

```
wildcardAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<wildcard(...)>
<listLabel(elem=label,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = LA(1);<\n>
<endif>
MATCHANY();
<checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabel(elem=label,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values. The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
FOLLOWPUSH(FOLLOW_<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)>ctx-><scope:delegateName()>-><endif><rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif><if(args)>, <args; separator=", "><endif>);<\n>
FOLLOWPOP();
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabel(elem=label,...)>
>>


/** A lexer rule reference
 *  The 'rule' argument was the target rule name, but now
 *  is type Rule, whose toString is same: the rule name.
 *  Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <<
/* <description> */
<if(label)>
{
```

```
  ANTLR3_MARKER <label>Start<elementIndex> = GETCHARINDEX();
  <if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
  <checkRuleBacktrackFailure()>
  <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
  <label>->setType(<label>, ANTLR3_TOKEN_INVALID);
  <label>->setStartIndex(<label>, <label>Start<elementIndex>);
  <label>->setStopIndex(<label>, GETCHARINDEX()-1);
  <label>->input = INPUT;
}
<else>
<if(scope)>ctx-><scope:delegateName()>-><endif>m<rule.name>(ctx<if(scope)>-
><scope:delegateName()><endif> <if(args)>, <endif><args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
>>


/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabel(elem=label,...)>
>>


/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <<
<if(label)>
{
  ANTLR3_UINT32 <label>Start<elementIndex>;
  <labelType> <label>;
  <label>Start<elementIndex> = GETCHARINDEX();
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <label> = LEXSTATE->tokFactory->newToken(LEXSTATE->tokFactory);
  <label>->setType(<label>, ANTLR3_TOKEN_EOF);
  <label>->setStartIndex(<label>, <label>Start<elementIndex>);
  <label>->setStopIndex(<label>, GETCHARINDEX()-1);
  <label>->input = INPUT->tnstream->istream;
}
<else>
  MATCHC(ANTLR3_CHARSTREAM_EOF);
  <checkRuleBacktrackFailure()>
  <endif>
>>


// used for left-recursive rules
recRuleDefArg()                  ::= "int <recRuleArg()>"
recRuleArg()                     ::= "_p"
recRuleAltPredicate(ruleName,opPrec) ::= "<recRuleArg()> \<= <opPrec>"
```

```
recRuleSetResultAction()          ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)  ::= "$<name>=$<src>.<name>;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList, enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if ( LA(1)==ANTLR3_TOKEN_DOWN ) {
  MATCHT(ANTLR3_TOKEN_DOWN, NULL);
  <checkRuleBacktrackFailure()>
  <children:element()>
  MATCHT(ANTLR3_TOKEN_UP, NULL);
  <checkRuleBacktrackFailure()>
}
<else>
MATCHT(ANTLR3_TOKEN_DOWN, NULL);
<checkRuleBacktrackFailure()>
<children:element()>
MATCHT(ANTLR3_TOKEN_UP, NULL);
<checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if ( !(<evalPredicate(...)>) )
{
  <ruleBacktrackFailure()>
  <newFPE(...)>
}
>>


newFPE() ::= <<
  CONSTRUCTEX();
  EXCEPTION->type       = ANTLR3_FAILED_PREDICATE_EXCEPTION;
  EXCEPTION->message    = (void *)"<description>";
  EXCEPTION->ruleName   = (void *)"<ruleName>";
  <\n>
>>


// F i x e d  D F A  (if-then-else)

dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<

{
```

```
  int LA<decisionNumber>_<stateNumber> = LA(<k>);
  <edges; separator="\nelse ">
  else
  {
<if(eotPredictsAlt)>
    alt<decisionNumber>=<eotPredictsAlt>;
<else>
    <ruleBacktrackFailure()>

    <newNVException()>
    goto rule<ruleDescriptor.name>Ex;

<endif>
  }
}
>>


newNVException() ::= <<
CONSTRUCTEX();
EXCEPTION->type        = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
EXCEPTION->message     = (void *)"<description>";
EXCEPTION->decisionNum = <decisionNumber>;
EXCEPTION->state       = <stateNumber>;
<@noViableAltException()>
<\n>
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  int LA<decisionNumber>_<stateNumber> = LA(<k>);
  <edges; separator="\nelse ">
}
>>


/** A DFA state that is actually the loopback decision of a closure
 *  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
 *  This is used only in the lexer so that for ('a')* on the end of a rule
 *  anything other than 'a' predicts exiting.
 */

dfaLoopbackStateDecls()::= <<
ANTLR3_UINT32   LA<decisionNumber>_<stateNumber>;
```

```
>>
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
{
  /* dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState)
  */
  int LA<decisionNumber>_<stateNumber> = LA(<k>);
  <edges; separator="\nelse "><\n>
  <if(eotPredictsAlt)>
  <if(!edges)>
alt<decisionNumber>=<eotPredictsAlt>; <! if no edges, don't gen ELSE !>
<else>
  else
  {
alt<decisionNumber>=<eotPredictsAlt>;
  }<\n>
  <endif>
  <endif>
}
>>

/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber>=<alt>;"

/** A simple edge with an expression.  If the expression is satisfied,
 * enter to the target state.  To handle gated productions, we may
 * have to evaluate some predicates for this edge.
 */
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>))
{
   <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 * decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
<edges; separator="\n">

default:
<if(eotPredictsAlt)>
   alt<decisionNumber>=<eotPredictsAlt>;
<else>
```

```
  <ruleBacktrackFailure()>
  <newNVException()>
  goto rule<ruleDescriptor.name>Ex;<\n>
<endif>
}<\n>
>>


dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
  <edges; separator="\n">
}<\n>
>>


dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch ( LA(<k>) )
{
<edges; separator="\n"><\n>
<if(eotPredictsAlt)>
default:
  alt<decisionNumber>=<eotPredictsAlt>;
  break;<\n>
<endif>
}<\n>
>>


dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it |case <it>:}; separator="\n">
 {
  <targetState>
 }
  break;
>>


// C y c l i c   D F A


/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
alt<decisionNumber> = cdfa<decisionNumber>.predict(ctx, RECOGNIZER, ISTREAM,
&cdfa<decisionNumber>);
<checkRuleBacktrackFailure()>
>>


/* Dump DFA tables as static initialized arrays of shorts(16 bits)/characters(8 bits)
 * which are then used to statically initialize the dfa structure, which means that there
```

```
 * is no runtime initialization whatsoever, other than anything the C compiler might
 * need to generate. In general the C compiler will lay out memory such that there is no
 * runtime code required.
 */
cyclicDFA(dfa) ::= <<
/** Static dfa state tables for Cyclic dfa:
 *    <dfa.description>
 */
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eot[<dfa.numberOfStates>] =
   {
 <dfa.eot; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_eof[<dfa.numberOfStates>] =
   {
 <dfa.eof; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_min[<dfa.numberOfStates>] =
   {
 <dfa.min; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_max[<dfa.numberOfStates>] =
   {
 <dfa.max; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_accept[<dfa.numberOfStates>] =
   {
 <dfa.accept; wrap="\n", separator=", ", null="-1">
   };
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_special[<dfa.numberOfStates>] =
   {
 <dfa.special; wrap="\n", separator=", ", null="-1">
   };

/** Used when there is no transition table entry for a particular state */
#define dfa<dfa.decisionNumber>_T_empty     NULL

<dfa.edgeTransitionClassMap.keys:{ table |
static const ANTLR3_INT32 dfa<dfa.decisionNumber>_T<i0>[] =
   {
 <table; separator=", ", wrap="\n", null="-1">
  \};}; null = "">

/* Transition tables are a table of sub tables, with some tables
 * reused for efficiency.
 */
static const ANTLR3_INT32 * const dfa<dfa.decisionNumber>_transitions[] =
{
   <dfa.transitionEdgeTables:{xref|dfa<dfa.decisionNumber>_T<xref>}; separator=", ", wrap="\n", null="_empty">
```

```
};

<if(dfa.specialStateSTs)>
static ANTLR3_INT32 dfa<dfa.decisionNumber>_sst(p<name> ctx, pANTLR3_BASE_RECOGNIZER recognizer,
pANTLR3_INT_STREAM is, pANTLR3_CYCLIC_DFA dfa, ANTLR3_INT32 s)
{
    ANTLR3_INT32    _s;

    _s    = s;
    switch  (s)
    {
    <dfa.specialStateSTs:{state |
    case <i0>:

 <state>}; separator="\n">
    }
<if(backtracking)>
    if (BACKTRACKING > 0)
    {
 FAILEDFLAG = ANTLR3_TRUE;
 return -1;
    }
<endif>

    CONSTRUCTEX();
    EXCEPTION->type        = ANTLR3_NO_VIABLE_ALT_EXCEPTION;
    EXCEPTION->message     = (void *)"<dfa.description>";
    EXCEPTION->decisionNum = <dfa.decisionNumber>;
    EXCEPTION->state       = _s;
    <@noViableAltException()>
    return -1;
}
<endif>

<@errorMethod()>

/* Declare tracking structure for Cyclic DFA <dfa.decisionNumber>
*/
static
ANTLR3_CYCLIC_DFA cdfa<dfa.decisionNumber>
  = {
    <dfa.decisionNumber>,     /* Decision number of this dfa    */
    /* Which decision this represents:   */
    (const pANTLR3_UCHAR)"<dfa.description>",
<if(dfa.specialStateSTs)>
    (CDFA_SPECIAL_FUNC) dfa<dfa.decisionNumber>_sst,
<else>
    (CDFA_SPECIAL_FUNC) antlr3dfaspecialStateTransition, /* Default special state transition function */
```

```
<endif>

    antlr3dfaspecialTransition,  /* DFA specialTransition is currently just a default function in the runtime */
    antlr3dfapredict,   /* DFA simulator function is in the runtime */
    dfa<dfa.decisionNumber>_eot,    /* EOT table       */
    dfa<dfa.decisionNumber>_eof,    /* EOF table       */
    dfa<dfa.decisionNumber>_min,    /* Minimum tokens for each state   */
    dfa<dfa.decisionNumber>_max,    /* Maximum tokens for each state   */
    dfa<dfa.decisionNumber>_accept, /* Accept table       */
    dfa<dfa.decisionNumber>_special, /* Special transition states     */
    dfa<dfa.decisionNumber>_transitions /* Table of transition tables     */


};
/* End of Cyclic DFA <dfa.decisionNumber>
* ---------------------
*/
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
*  state.
*/
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
    ANTLR3_UINT32 LA<decisionNumber>_<stateNumber>;<\n>
    ANTLR3_MARKER index<decisionNumber>_<stateNumber>;<\n>

 LA<decisionNumber>_<stateNumber> = LA(1);<\n>
    <if(semPredState)> <! get next lookahead symbol to test edges, then rewind !>
    index<decisionNumber>_<stateNumber> = INDEX();<\n>
    REWINDLAST();<\n>
    <endif>
    s = -1;
    <edges; separator="\nelse ">
<if(semPredState)> <! return input cursor to state before we rewound !>
SEEK(index<decisionNumber>_<stateNumber>);<\n>
<endif>
    if ( s>=0 )
    {
return s;
    }
}
break;
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
*  state to jump to next if successful.
*/
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
```

```
if ( <if(predicates)>(<predicates>) && <endif>(<labelExpr>) )
{
  s = <targetStateNumber>;
}<\n>
>>
```

/** An edge pointing at end-of-token; essentially matches any char;
 * always jump to the target.
 */
```
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>
```

// D F A   E X P R E S S I O N S

```
andPredicates(left,right) ::= "( (<left>) && (<right>) )"
```

```
orPredicates(operands) ::= "(<operands:{o|(<o>)}; separator=\"||\">)"
```

```
notPredicate(pred) ::= "!( <evalPredicate(pred,{})> )"
```

```
evalPredicate(pred,description) ::= "(<pred>)"
```

```
evalSynPredicate(pred,description) ::= "<pred>(ctx)"
```

```
lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<stateNumber> == <atom>"
```

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
```
isolatedLookaheadTest(atom,k,atomAsInt) ::= "LA(<k>) == <atom>"
```

```
lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
((LA<decisionNumber>_<stateNumber> >= <lower>) && (LA<decisionNumber>_<stateNumber> \<= <upper>))
%>
```

```
isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= "((LA(<k>) >= <lower>) &&
(LA(<k>) \<= <upper>))"
```

```
setTest(ranges) ::= "<ranges; separator=\" || \">"
```

// A T T R I B U T E S

```
makeScopeSet() ::= <<
/* makeScopeSet()
*/
```
/** Definition of the <scope.name> scope variable tracking

```
*  structure. An instance of this structure is created by calling
*  <name>_<scope.name>Push().
*/
typedef struct  <scopeStruct(sname=scope.name,...)>_struct
{
   /** Function that the user may provide to be called when the
    *  scope is destroyed (so you can free pANTLR3_HASH_TABLES and so on)
    *
    * \param POinter to an instance of this typedef/struct
    */
   void    (ANTLR3_CDECL *free) (struct <scopeStruct(sname=scope.name,...)>_struct * frame);

   /* =============================================================================
    * Programmer defined variables...
    */
   <scope.attributes:{it |<it.decl>;}; separator="\n">

   /* End of programmer defined variables
    * =============================================================================
    */
}
   <scopeStruct(sname=scope.name,...)>, * <scopeType(sname=scope.name,...)>;

>>

globalAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

ruleAttributeScopeDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDecl(scope)
*/
<makeScopeSet(...)>
<endif>
>>

globalAttributeScopeFuncDecl(scope) ::=
<<
/* globalAttributeScopeFuncDecl(scope)
*/
<if(scope.attributes)>
/* --------------------------------------------------------------------------
* Function declaration for creating a <name>_<scope.name> scope set
```

```
*/
static <scopeType(sname=scope.name,...)>  <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ------------------------------------------------------------------------------ */


<endif>
>>


globalAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncMacro(scope)
*/
/** Function  for popping the top value from a <scopeStack(sname=scope.name)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
  // First see if the user defined a function they want to be called when a
  // scope is popped/freed.
  //
 // If the user supplied the scope entries with a free function,then call it first
 //
  if (SCOPE_TOP(<scope.name>)->free != NULL)
{
    SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
}

  // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
  // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
  // next too far so we don't want to keep freeing and allocating them
  //
  ctx-><scopeStack(sname=scope.name,...)>_limit--;
  SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>-
>get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
}
<endif>
>>


ruleAttributeScopeFuncDecl(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncDecl(scope)
*/
/* ------------------------------------------------------------------------------
* Function declarations for creating a <name>_<scope.name> scope set
*/
static <scopeType(sname=scope.name,...)>  <scopePushName(sname=scope.name,...)>(p<name> ctx);
static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope);
/* ------------------------------------------------------------------------------ */
```

```
<endif>
>>

ruleAttributeScopeFuncMacro(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncMacro(scope)
*/
/** Function for popping the top value from a <scopeStack(sname=scope.name,...)>
*/
void
<scopePopName(sname=scope.name,...)>(p<name> ctx)
{
  // First see if the user defined a function they want to be called when a
  // scope is popped/freed.
  //
 // If the user supplied the scope entries with a free function,then call it first
 //
  if (SCOPE_TOP(<scope.name>)->free != NULL)
{
    SCOPE_TOP(<scope.name>)->free(SCOPE_TOP(<scope.name>));
}

  // Now we decrement the scope's upper limit bound. We do not actually pop the scope as
  // we want to reuse scope entries if we do continuous push and pops. Most scopes don't
  // next too far so we don't want to keep freeing and allocating them
  //
  ctx-><scopeStack(sname=scope.name,...)>_limit--;
  SCOPE_TOP(<scope.name>) = (<scopeType(sname=scope.name)>)(ctx-><scopeStack(sname=scope.name,...)>-
>get(ctx-><scopeStack(sname=scope.name,...)>, ctx-><scopeStack(sname=scope.name,...)>_limit - 1));
}

<endif>
>>

globalAttributeScopeDef(scope) ::=
<<
/* globalAttributeScopeDef(scope)
*/
<if(scope.attributes)>
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name)>_limit;
/** Pointer to the top of the stack for the global scope <scopeStack(sname=scope.name)>
*/
<scopeType(sname=scope.name,...)>   (*<scopePushName(sname=scope.name,...)>)(struct <name>_Ctx_struct *
```

```
ctx);
<scopeType(sname=scope.name,...)>   <scopeTopDecl(sname=scope.name,...)>;


<endif>
>>


ruleAttributeScopeDef(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeDef(scope)
*/
/** Pointer to the  <scope.name> stack for use by <scopePushName(sname=scope.name)>()
*  and <scopePopName(sname=scope.name,...)>()
*/
pANTLR3_STACK <scopeStack(sname=scope.name,...)>;
ANTLR3_UINT32 <scopeStack(sname=scope.name,...)>_limit;
<scopeType(sname=scope.name,...)>  (*<scopePushName(sname=scope.name,...)>)(struct <name>_Ctx_struct *
ctx);
<scopeType(sname=scope.name,...)>  <scopeTopDecl(sname=scope.name,...)>;


<endif>
>>


globalAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>


ruleAttributeScopeFuncs(scope) ::= <<
<if(scope.attributes)>
/* ruleAttributeScopeFuncs(scope)
*/
<attributeFuncs(scope)>
<endif>
>>


globalAttributeScope(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>    = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>   = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit   = 0;
<scopeTop(sname=scope.name,...)>     = NULL;
<endif>
>>
```

```
ruleAttributeScope(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopePushName(sname=scope.name,...)>    = <scopePushName(sname=scope.name,...)>;
ctx-><scopeStack(sname=scope.name,...)>    = antlr3StackNew(0);
ctx-><scopeStack(sname=scope.name,...)>_limit    = 0;
<scopeTop(sname=scope.name,...)>      = NULL;
<endif>
>>
globalAttributeScopeFree(scope) ::= <<
<if(scope.attributes)>
/* globalAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>


ruleAttributeScopeFree(scope) ::=
<<
<if(scope.attributes)>
/* ruleAttributeScope(scope)
*/
ctx-><scopeStack(sname=scope.name,...)>->free(ctx-><scopeStack(sname=scope.name,...)>);
<endif>
>>


scopeTopDecl(sname) ::= <<
p<name>_<sname>Top
>>


scopeTop(sname) ::= <<
ctx-><scopeTopDecl(sname=sname,...)>
>>


scopePop(sname) ::= <<
<scopePopName(sname=sname,...)>(ctx);
>>


scopePush(sname) ::= <<
p<name>_<sname>Push(ctx)
>>


scopePopName(sname) ::= <<
p<name>_<sname>Pop
>>
```

```
scopePushName(sname) ::= <<
p<name>_<sname>Push
>>


scopeType(sname) ::= <<
p<name>_<sname>_SCOPE
>>


scopeStruct(sname) ::= <<
<name>_<sname>_SCOPE
>>


scopeStack(sname) ::= <<
p<name>_<sname>Stack
>>


attributeFuncs(scope) ::= <<
<if(scope.attributes)>
/* attributeFuncs(scope)
*/

static void ANTLR3_CDECL <scope.name>Free(<scopeType(sname=scope.name)> scope)
{
   ANTLR3_FREE(scope);
}

/** \brief Allocate initial memory for a <name> <scope.name> scope variable stack entry and
*        add it to the top of the stack.
*
* \remark
* By default the structure is freed with ANTLR_FREE(), but you can use the
* the \@init action to install a pointer to a custom free() routine by
* adding the code:
* \code
*   <scopeTop(sname=scope.name)>->free = myroutine;
* \endcode
*
* With lots of comments of course! The routine should be declared in
* \@members { } as:
* \code
*   void ANTLR3_CDECL myfunc( <scopeType(sname=scope.name)> ptr).
* \endcode
*
* It should perform any custom freeing stuff that you need (call ANTLR_FREE3, not free()
* NB: It should not free the pointer it is given, which is the scope stack entry itself
* and will be freed by the function that calls your custom free routine.
*
```

```
*/
static <scopeType(sname=scope.name)>
<scopePushName(sname=scope.name)>(p<name> ctx)
{
    /* Pointer used to create a new set of attributes
     */
    <scopeType(sname=scope.name)>     newAttributes;

    /* Allocate the memory for a new structure if we need one.
     */
    if (ctx-><scopeStack(sname=scope.name)>->size(ctx-><scopeStack(sname=scope.name)>) > ctx-
><scopeStack(sname=scope.name)>_limit)
    {
        // The current limit value was less than the number of scopes available on the stack so
        // we can just reuse one. Our limit tracks the stack count, so the index of the entry we want
        // is one less than that, or conveniently, the current value of limit.
        //
        newAttributes = (<scopeType(sname=scope.name)>)ctx-><scopeStack(sname=scope.name)>->get(ctx-
><scopeStack(sname=scope.name)>, ctx-><scopeStack(sname=scope.name)>_limit);
    }
    else
    {
        // Need a new allocation
        //
        newAttributes = (<scopeType(sname=scope.name)>)
ANTLR3_MALLOC(sizeof(<scopeStruct(sname=scope.name)>));
        if  (newAttributes != NULL)
        {
            /* Standard ANTLR3 library implementation
             */
            ctx-><scopeStack(sname=scope.name)>->push(ctx-><scopeStack(sname=scope.name)>, newAttributes,
(void (*)(void *))<scope.name>Free);
        }
    }

    // Blank out any previous free pointer, the user might or might install a new one.
    //
    newAttributes->free = NULL;

    // Indicate the position in the available stack that the current level is at
    //
    ctx-><scopeStack(sname=scope.name)>_limit++;

 /* Return value is the pointer to the new entry, which may be used locally
  * without de-referencing via the context.
  */
  return  newAttributes;
}<\n>
```

```
<endif>
>>
returnStructName(r) ::= "<r.name>_return"

returnType() ::= <%
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
<ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>
<else>
<if(ruleDescriptor.hasSingleReturnValue)>
<ruleDescriptor.singleValueReturnType>
<else>
void
<endif>
<endif>
<else>
ANTLR3_BOOLEAN
<endif>
%>

/** Generate the C type associated with a single or multiple return
*   value(s).
*/
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
<referencedRule.grammar.recognizerName>_<referencedRule.name>_return
<else>
<if(referencedRule.hasSingleReturnValue)>
<referencedRule.singleValueReturnType>
<else>
void
<endif>
<endif>
%>

delegateName(d) ::= <<
<if(d.label)><d.label><else>g<it.name><endif>
>>

/** Using a type to init value map, try to init a type; if not in table
*   must be an object, default value is "0".
*/
initValue(typeName) ::= <<
= <cTypeInitMap.(typeName)>
>>

/** Define a rule label  */
```

```
ruleLabelDef(label) ::= <<
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text>;
#undef RETURN_TYPE_<label.label.text>
#define RETURN_TYPE_<label.label.text> <ruleLabelType(referencedRule=label.referencedRule)><\n>
>>
/**  Rule label default value */
ruleLabelInitVal(label) ::= <<
>>


ASTLabelType() ::=
"<if(recognizer.ASTLabelType)><recognizer.ASTLabelType><else>pANTLR3_BASE_TREE<endif>"


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasMultipleReturnValues)>
typedef struct <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>_struct
{
<if(!TREE_PARSER)>
  /** Generic return elements for ANTLR3 rules that are not in tree parsers or returning trees
   */
  pANTLR3_COMMON_TOKEN    start;
  pANTLR3_COMMON_TOKEN    stop;
<else>
  <recognizer.ASTLabelType>      start;
  <recognizer.ASTLabelType>      stop;
<endif>
  <@ruleReturnMembers()>
  <ruleDescriptor.returnScope.attributes:{it |<it.type> <it.name>;}; separator="\n">
}
  <ruleDescriptor.grammar.recognizerName>_<ruleDescriptor:returnStructName()>;<\n><\n>
<endif>
<endif>
>>


parameterScope(scope) ::= <<
<scope.attributes:{it |<it.decl>}; separator=", ">
>>


parameterAttributeRef(attr) ::= "<attr.name>"
parameterSetAttributeRef(attr,expr) ::= "<attr.name>=<expr>;"


/** Note that the scopeAttributeRef does not have access to the
 * grammar name directly
 */
```

```
scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>), ctx-
>SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name>
<else>
<if(index)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name>
<else>
 (SCOPE_TOP(<scope>))-><attr.name>
<endif>
<endif>
%>

scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get( ctx->SCOPE_STACK(<scope>), ctx-
>SCOPE_STACK(<scope>)->size(ctx->SCOPE_STACK(<scope>)) - <negIndex> - 1) ))-><attr.name> = <expr>;
<else>
<if(index)>
 ((SCOPE_TYPE(<scope>))(ctx->SCOPE_STACK(<scope>)->get(ctx->SCOPE_STACK(<scope>),
(ANTLR3_UINT32)<index> ) ))-><attr.name> = <expr>;
<else>
 (SCOPE_TOP(<scope>))-><attr.name>=<expr>;
<endif>
<endif>
%>

/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.size()>0 && $function::name.equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "ctx->SCOPE_STACK(<scope>)"

/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <<
<if(referencedRule.hasMultipleReturnValues)>
<scope>.<attr.name>
<else>
<scope>
<endif>
>>

returnAttributeRef(ruleDescriptor,attr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>
<else>
<attr.name>
```

```
<endif>
>>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name>=<expr>;
<else>
<attr.name>=<expr>;
<endif>
>>


/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"


// not sure the next are the right approach
//
tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
tokenLabelPropertyRef_tree(scope,attr) ::= "(<scope>->tree)"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>->getText(<scope>)->toInt32(<scope>->getText(<scope>)))"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>.start)"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>.stop)"
ruleLabelPropertyRef_tree(scope,attr) ::= "(<scope>.tree)"
ruleLabelPropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
(STRSTREAM->toStringSS(STRSTREAM, <scope>.start, <scope>.start))
<else>
(STRSTREAM->toStringTT(STRSTREAM, <scope>.start, <scope>.stop))
<endif>
>>

ruleLabelPropertyRef_st(scope,attr) ::= "<scope>.st"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::= "(<scope>->getType(<scope>))"
lexerRuleLabelPropertyRef_line(scope,attr) ::= "(<scope>->getLine(<scope>))"
lexerRuleLabelPropertyRef_pos(scope,attr) ::= "(<scope>->getCharPositionInLine(<scope>))"
```

lexerRuleLabelPropertyRef_channel(scope,attr) ::= "(<scope>->getChannel(<scope>))"
lexerRuleLabelPropertyRef_index(scope,attr) ::= "(<scope>->getTokenIndex(<scope>))"
lexerRuleLabelPropertyRef_text(scope,attr) ::= "(<scope>->getText(<scope>))"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.start"
rulePropertyRef_stop(scope,attr) ::= "retval.stop"
rulePropertyRef_tree(scope,attr) ::= "retval.tree"
rulePropertyRef_text(scope,attr) ::= <<
<if(TREE_PARSER)>
INPUT->toStringSS(INPUT, ADAPTOR->getTokenStartIndex(ADAPTOR, retval.start), ADAPTOR-
>getTokenStopIndex(ADAPTOR, retval.start))
<else>
STRSTREAM->toStringTT(STRSTREAM, retval.start, LT(-1))
<endif>
>>
rulePropertyRef_st(scope,attr) ::= "retval.st"

lexerRulePropertyRef_text(scope,attr) ::= "LEXER->getText(LEXER)"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "LEXSTATE->tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "LEXSTATE->tokenStartCharPositionInLine"
lexerRulePropertyRef_channel(scope,attr) ::= "LEXSTATE->channel"
lexerRulePropertyRef_start(scope,attr) ::= "LEXSTATE->tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(LEXER->getCharIndex(LEXER)-1)"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_int(scope,attr) ::= "LEXER->getText(LEXER)->toInt32(LEXER->getText(LEXER))"

// setting $st and $tree is allowed in local rule. everything else is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.tree=<expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.st=<expr>;"

/** How to deal with an @after for C targets. Because we cannot rely on
 * any garbage collection, after code is executed even in backtracking
 * mode. Must be documented clearly.
 */
execAfter(action) ::= <<
{
  <action>
}
>>

/** How to execute an action (when not backtracking) */
execAction(action) ::= <<
<if(backtracking)>
<if(actions.(actionScope).synpredgate)>

```
if ( <actions.(actionScope).synpredgate> )
{
  <action>
}
<else>
if ( BACKTRACKING == 0 )
{
  <action>
}
<endif>
<else>
{
  <action>
}
<endif>
>>

// M I S C (properties, etc...)

bitsetDeclare(name, words64) ::= <<

/** Bitset defining follow set for error recovery in rule state: <name>  */
static ANTLR3_BITWORD <name>_bits[] = { <words64:{it |ANTLR3_UINT64_LIT(<it>)}; separator=", "> };
static  ANTLR3_BITSET_LIST <name> = { <name>_bits, <length(words64)> };
>>

bitset(name, words64) ::= <<
antlr3BitsetSetAPI(&<name>);<\n>
>>

codeFileExtension() ::= ".c"

true_value() ::= "ANTLR3_TRUE"
false_value() ::= "ANTLR3_FALSE"
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-jar/org/antlr/codegen/templates/C/C.stg
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```
/*
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 *
 * Conversion to C#:
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 *
```

```
/** Template subgroup to add template rewrite output
 *  If debugging, then you'll also get STDbg.stg loaded.
 */

@outputFile.imports() ::= <<
<@super.imports()>
using Antlr3.ST;
using Antlr3.ST.Language;
>>

@genericParser.members() ::= <<
<@super.members()>
private StringTemplateGroup _templateGroup = new StringTemplateGroup("<name>Templates",
typeof(AngleBracketTemplateLexer) );

public StringTemplateGroup TemplateGroup
{
 get { return _templateGroup; }
 set { _templateGroup = value; }
}
>>

ruleReturnBaseType() ::= <%
Template<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<StringTemplate, <labelType>>
%>
```

```
/** x+=rule when output=template */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
<listLabelElem(elem={<label>.Template},elemType="StringTemplate",...)>
>>


rewriteTemplate(alts) ::= <<

// TEMPLATE REWRITE
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)
{
 <alts:rewriteTemplateAlt(); separator="else ">
 <if(rewriteMode)><replaceTextInLine()><endif>
}
<else>
<alts:rewriteTemplateAlt(); separator="else ">
<if(rewriteMode)><replaceTextInLine()><endif>
<endif>
>>


replaceTextInLine() ::= <<
<if(TREE_PARSER)>
((TokenRewriteStream)input.TokenStream).Replace(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start),
 retval.Template);
<else>
((TokenRewriteStream)input).Replace(
 retval.Start.TokenIndex,
 input.LT(-1).TokenIndex,
 retval.Template);
<endif>
>>


rewriteTemplateAlt(it) ::= <<
// <it.description>
<if(it.pred)>
if (<it.pred>)
{
 retval.Template = <it.alt>;
}<\n>
<else>
{
 retval.Template = <it.alt>;
}<\n>
<endif>
>>
```

```
rewriteEmptyTemplate(alts) ::= <<
null;
>>


/** Invoke a template with a set of attribute name/value pairs.
 *  Set the value of the rule's template *after* having set
 *  the attributes because the rule's template might be used as
 *  an attribute to build a bigger template; you get a self-embedded
 *  template.
 */
rewriteExternalTemplate(name,args) ::= <%
TemplateGroup.GetInstanceOf("<name>"<optionalArguments(args)>)
%>


/** expr is a string expression that says what template to load */
rewriteIndirectTemplate(expr,args) ::= <%
TemplateGroup.GetInstanceOf(<expr><optionalArguments(args)>)
%>


/** Invoke an inline template with a set of attribute name/value pairs */
rewriteInlineTemplate(args, template) ::= <%
new StringTemplate(TemplateGroup, "<template>"<optionalArguments(args)>)
%>


optionalArguments(args) ::= <<
<if(args)>,
 new Dictionary\<string, object>() { <args:optionalArgument(); separator=", "> }
<endif>
>>


optionalArgument(it) ::= <<
{"<it.name>", <it.value>}
>>


/** plain -> {foo} action */
rewriteAction(action) ::= <<
<action>
>>


/** An action has %st.attrName=expr; or %{st}.attrName=expr; */
actionSetAttribute(st,attrName,expr) ::= <<
(<st>).SetAttribute("<attrName>",<expr>);
>>


/** Translate %{stringExpr} */
actionStringConstructor(stringExpr) ::= <<
new StringTemplate(TemplateGroup,<stringExpr>)
```

>>

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
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THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
group AST;

@outputFile.imports() ::= <<
<@super.imports()>
>>

@genericParser.members() ::= <<
<@super.members()>
<parserMembers()>
>>

/** Add an adaptor property that knows how to build trees */
parserMembers() ::= <<
<!protected TreeAdaptor adaptor = new CommonTreeAdaptor();<\n>!>

```
setTreeAdaptor: function(adaptor) {
  this.adaptor = adaptor;
  <grammar.directDelegates:{g|<g:delegateName()>.setTreeAdaptor(this.adaptor);}>
},
getTreeAdaptor: function() {
  return this.adaptor;
},
>>


@returnScope.ruleReturnMembers() ::= <<
getTree: function() { return this.tree; }
>>


/** Add a variable to track rule's return AST */
ruleDeclarations() ::= <<
<super.ruleDeclarations()>
var root_0 = null;<\n>
>>


ruleLabelDefs() ::= <<
<super.ruleLabelDefs()>
<ruleDescriptor.tokenLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.tokenListLabels:{var <it.label.text>_tree=null;}; separator="\n">
<ruleDescriptor.allTokenRefsInAltsWithRewrites
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleTokenStream(this.adaptor,"token <it>");};
separator="\n">
<ruleDescriptor.allRuleRefsInAltsWithRewrites
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"rule <it>");};
separator="\n">
>>


/** When doing auto AST construction, we must define some variables;
 * These should be turned off if doing rewrites.  This must be a "mode"
 * as a rule could have both rewrite and AST within the same alternative
 * block.
 */
@alt.declarations() ::= <<
<if(autoAST)>
<if(outerAlt)>
<if(!rewriteMode)>
root_0 = this.adaptor.nil();<\n>
<endif>
<endif>
<endif>
>>


// T r a c k i n g   R u l e   E l e m e n t s
```

```
/** ID and track it for use in a rewrite rule */
tokenRefTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)> <! Track implies no auto AST construction!>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>


/** ids+=ID and track it for use in a rewrite rule; adds to ids *and*
*  to the tracking list stream_ID for use in the rewrite.
*/
tokenRefTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefTrack(...)>
<listLabel(elem=label,...)>
>>


/** ^(ID ...) track for rewrite */
tokenRefRuleRootTrack(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefBang(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<token>.add(<label>);<\n>
>>


/** Match ^(label+=TOKEN ...) track for rewrite */
tokenRefRuleRootTrackAndListLabel(token,label,elementIndex,terminalOptions) ::= <<
<tokenRefRuleRootTrack(...)>
<listLabel(elem=label,...)>
>>


wildcardTrack(label,elementIndex) ::= <<
<super.wildcard(...)>
>>


/** rule when output=AST and tracking for rewrite */
ruleRefTrack(rule,label,elementIndex,args,scope) ::= <<
<super.ruleRef(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule.name>.add(<label>.getTree());
>>


/** x+=rule when output=AST and tracking for rewrite */
ruleRefTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>


/** ^(rule ...) rewrite */
ruleRefRuleRootTrack(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRoot(...)>
<if(backtracking)>if ( <actions.(actionScope).synpredgate> ) <endif>stream_<rule>.add(<label>.getTree());
>>
```

```
/** ^(x+=rule ...) rewrite */
ruleRefRuleRootTrackAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRefRuleRootTrack(...)>
<listLabel(elem=label+".getTree()",...)>
>>
```

// R e w r i t e

```
rewriteCode(
 alts, description,
 referencedElementsDeep, // ALL referenced elements to right of ->
 referencedTokenLabels,
 referencedTokenListLabels,
 referencedRuleLabels,
 referencedRuleListLabels,
   referencedWildcardLabels,
   referencedWildcardListLabels,
 rewriteBlockLevel, enclosingTreeLevel, treeLevel) ::=
<<

// AST REWRITE
// elements: <referencedElementsDeep; separator=", ">
// token labels: <referencedTokenLabels; separator=", ">
// rule labels: <referencedRuleLabels; separator=", ">
// token list labels: <referencedTokenListLabels; separator=", ">
// rule list labels: <referencedRuleListLabels; separator=", ">
<if(backtracking)>
if ( <actions.(actionScope).synpredgate> ) {<\n>
<endif>
<prevRuleRootRef()>.tree = root_0;
<rewriteCodeLabels()>
root_0 = this.adaptor.nil();
<alts:rewriteAlt(); separator="else ">
<! if tree parser and rewrite=true !>
<if(TREE_PARSER)>
<if(rewriteMode)>
<prevRuleRootRef()>.tree = this.adaptor.rulePostProcessing(root_0);
this.input.replaceChildren(this.adaptor.getParent(retval.start),
               this.adaptor.getChildIndex(retval.start),
               this.adaptor.getChildIndex(_last),
               retval.tree);
<endif>
<endif>
<! if parser or tree-parser && rewrite!=true, we need to set result !>
<if(!TREE_PARSER)>
<prevRuleRootRef()>.tree = root_0;
<else>
<if(!rewriteMode)>
```

```
<prevRuleRootRef()>.tree = root_0;
<endif>
<endif>
<if(backtracking)>
}
<endif>
>>


rewriteCodeLabels() ::= <<
<referencedTokenLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>",<it>);};
  separator="\n"
>
<referencedTokenListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRule<rewriteElementType>Stream(this.adaptor,"token
<it>", list_<it>);};
  separator="\n"
>
<referencedWildcardLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard <it>",<it>);};
  separator="\n"
>
<referencedWildcardListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"wildcard <it>",list_<it>);};
  separator="\n"
>
<referencedRuleLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token
<it>",<it>!=null?<it>.tree:null);};
  separator="\n"
>
<referencedRuleListLabels
  :{var stream_<it>=new org.antlr.runtime.tree.RewriteRuleSubtreeStream(this.adaptor,"token <it>",list_<it>);};
  separator="\n"
>
>>


/** Generate code for an optional rewrite block; note it uses the deep ref'd element
 *  list rather shallow like other blocks.
 */
rewriteOptionalBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
```

```
if ( <referencedElementsDeep:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElementsDeep:{el | stream_<el>.reset();<\n>}>
>>

rewriteClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
// <fileName>:<description>
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewritePositiveClosureBlock(
 alt,rewriteBlockLevel,
 referencedElementsDeep, // all nested refs
 referencedElements, // elements in immediately block; no nested blocks
 description) ::=
<<
if ( !(<referencedElements:{el | stream_<el>.hasNext()}; separator="||">) ) {
  throw new org.antlr.runtime.tree.RewriteEarlyExitException();
}
while ( <referencedElements:{el | stream_<el>.hasNext()}; separator="||"> ) {
  <alt>
}
<referencedElements:{el | stream_<el>.reset();<\n>}>
>>

rewriteAlt(a) ::= <<
// <a.description>
<if(a.pred)>
if (<a.pred>) {
  <a.alt>
}<\n>
<else>
{
  <a.alt>
}<\n>
<endif>
>>

/** For empty rewrites: "r : ... -> ;" */
```

```
rewriteEmptyAlt() ::= "root_0 = null;"

rewriteTree(root,children,description,enclosingTreeLevel,treeLevel) ::= <<
// <fileName>:<description>
{
var root_<treeLevel> = this.adaptor.nil();
<root:rewriteElement()>
<children:rewriteElement()>
this.adaptor.addChild(root_<enclosingTreeLevel>, root_<treeLevel>);
}<\n>
>>

rewriteElementList(elements) ::= "<elements:rewriteElement()>"

rewriteElement(e) ::= <<
<@pregen()>
<e.el>
>>

/** Gen ID or ID[args] */
rewriteTokenRef(token,elementIndex,terminalOptions,args) ::= <<
this.adaptor.addChild(root_<treeLevel>, <createRewriteNodeFromElement(...)>);<\n>
>>

/** Gen $label ... where defined via label=ID */
rewriteTokenLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen $label ... where defined via label+=ID */
rewriteTokenListLabelRef(label,elementIndex) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextNode());<\n>
>>

/** Gen ^($label ...) */
rewriteTokenLabelRefRoot(label,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>

/** Gen ^($label ...) where label+=... */
rewriteTokenListLabelRefRoot ::= rewriteTokenLabelRefRoot

/** Gen ^(ID ...) or ^(ID[args] ...) */
rewriteTokenRefRoot(token,elementIndex,terminalOptions,args) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createRewriteNodeFromElement(...)>, root_<treeLevel>);<\n>
>>

rewriteImaginaryTokenRef(args,token,terminalOptions,elementIndex) ::= <<
```

```
this.adaptor.addChild(root_<treeLevel>, <createImaginaryNode(tokenType=token, ...)>);<\n>
>>

rewriteImaginaryTokenRefRoot(args,token,terminalOptions,elementIndex) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<createImaginaryNode(tokenType=token, ...)>,
root_<treeLevel>);<\n>
>>

/** plain -> {foo} action */
rewriteAction(action) ::= <<
root_0 = <action>;<\n>
>>

/** What is the name of the previous value of this rule's root tree?  This
 *  let's us refer to $rule to mean previous value.  I am reusing the
 *  variable 'tree' sitting in retval struct to hold the value of root_0 right
 *  before I set it during rewrites.  The assign will be to retval.tree.
 */
prevRuleRootRef() ::= "retval"

rewriteRuleRef(rule) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<rule>.nextTree());<\n>
>>

rewriteRuleRefRoot(rule) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<rule>.nextNode(), root_<treeLevel>);<\n>
>>

rewriteNodeAction(action) ::= <<
this.adaptor.addChild(root_<treeLevel>, <action>);<\n>
>>

rewriteNodeActionRoot(action) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(<action>, root_<treeLevel>);<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel=rule */
rewriteRuleLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen $ruleLabel ... where defined via ruleLabel+=rule */
rewriteRuleListLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>

/** Gen ^($ruleLabel ...) where ruleLabel=rule */
rewriteRuleLabelRefRoot(label) ::= <<
```

```
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>


/** Gen ^($ruleLabel ...) where ruleLabel+=rule */
rewriteRuleListLabelRefRoot(label) ::= <<
root_<treeLevel> = this.adaptor.becomeRoot(stream_<label>.nextNode(), root_<treeLevel>);<\n>
>>


rewriteWildcardLabelRef(label) ::= <<
this.adaptor.addChild(root_<treeLevel>, stream_<label>.nextTree());<\n>
>>


createImaginaryNode(tokenType,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
<! new MethodNode(IDLabel, args) !>
new <terminalOptions.node>(<tokenType><if(args)>, <args; separator=", "><endif>)
<else>
this.adaptor.create(<tokenType>, <args; separator=", "><if(!args)>"<tokenType>"<endif>)
<endif>
>>


createRewriteNodeFromElement(token,terminalOptions,args) ::= <<
<if(terminalOptions.node)>
new <terminalOptions.node>(stream_<token>.nextToken()<if(args)>, <args; separator=", "><endif>)
<else>
<if(args)> <! must create new node from old !>
this.adaptor.create(<token>, <args; separator=", ">)
<else>
stream_<token>.nextNode()
<endif>
<endif>
>>
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
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*/
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```

```
csharpVisibilityMap ::= [
 "private":"private",
 "protected":"protected",
 "public":"public",
 "fragment":"private",
 default:"private"
]

/** The overall file structure of a recognizer; stores methods for rules
 *  and cyclic DFAs plus support code.
 */
outputFile( LEXER,PARSER,TREE_PARSER, actionScope, actions,
   docComment, recognizer,
   name, tokens, tokenNames, rules, cyclicDFAs,
   bitsets, buildTemplate, buildAST, rewriteMode, profile,
   backtracking, synpreds, memoize, numRules,
   fileName, ANTLRVersion, generatedTimestamp, trace,
   scopes, superClass, literals) ::=
<<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// $ANTLR <ANTLRVersion> <fileName> <generatedTimestamp>

<if(trace)>
#define ANTLR_TRACE
<endif>
<@debugPreprocessor()>
// The variable 'variable' is assigned but its value is never used.
#pragma warning disable 168, 219
// Unreachable code detected.
#pragma warning disable 162
// Missing XML comment for publicly visible type or member 'Type_or_Member'
#pragma warning disable 1591
```

```
<actions.(actionScope).header>

<@imports>
using System.Collections.Generic;
using Antlr.Runtime;
using Antlr.Runtime.Misc;
<if(TREE_PARSER)>
using Antlr.Runtime.Tree;
using RewriteRuleITokenStream = Antlr.Runtime.Tree.RewriteRuleTokenStream;
<endif>
using ConditionalAttribute = System.Diagnostics.ConditionalAttribute;
<@end>
<if(actions.(actionScope).namespace)>
namespace <actions.(actionScope).namespace>
{
<endif>
<docComment>
<recognizer>
<if(actions.(actionScope).namespace)>

} // namespace <actions.(actionScope).namespace>
<endif>
>>

lexerInputStreamType() ::= <<
<actions.(actionScope).inputStreamType; null="ICharStream">
>>

lexer(grammar, name, tokens, scopes, rules, numRules, filterMode, labelType="CommonToken",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Lexer
<endif>}) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">
 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <actions.lexer.members>

  // delegates
  <grammar.delegates:
      {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
  // delegators
  <grammar.delegators:
      {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
  <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
```

```
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>()<! needed by subclasses !>
{
 OnCreated();
}

<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}> )
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
{
}

<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<lexerInputStreamType()> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(memoize)>
<if(grammar.grammarIsRoot)>
 state.ruleMemo = new System.Collections.Generic.Dictionary\<int, int>[<numRules>+1];\<n><! index from 1..n !>
<endif>
<endif>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, this.state<trunc(g.delegators):{p|,
<p:delegateName()>}>, this);}; separator="\n">
 <grammar.delegators:
  {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>

 OnCreated();
}
public override string GrammarFileName { get { return "<fileName>"; } }

private static readonly bool[] decisionCanBacktrack = new bool[0];

<if(grammar.hasDelegates)>
public override <lexerInputStreamType()> CharStream
{
 get
 {
  return base.CharStream;
 }
 set
 {
  base.CharStream = value;
  <grammar.directDelegates:
   {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
  <grammar.delegators:
   {g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
```

```
  <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
 }
}


<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }
<endif>


<endif>
<if(filterMode)>
 <filteringNextToken()>
<endif>


 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}


  <rules; separator="\n">


 <insertLexerSynpreds(synpreds)>


 #region DFA
 <cyclicDFAs:{dfa | DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">


 protected override void InitDFAs()
 {
  base.InitDFAs();
  <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>(this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif>);}; separator="\n">
 }


 <cyclicDFAs:cyclicDFA()> <! dump tables for all DFA !>
 #endregion


}
>>


/** A override of Lexer.nextToken() that backtracks over mTokens() looking
 *  for matches.  No error can be generated upon error; just rewind, consume
 *  a token and then try again.  backtracking needs to be set as well.
 *  Make rule memoization happen only at levels above 1 as we start mTokens
```

```
*  at backtracking==1.
*/
filteringNextToken() ::= <<
public override IToken NextToken()
{
 while (true)
 {
  if (input.LA(1) == CharStreamConstants.EndOfFile)
  {
   IToken eof = new CommonToken((ICharStream)input, CharStreamConstants.EndOfFile, TokenChannels.Default,
input.Index, input.Index);
   eof.Line = Line;
   eof.CharPositionInLine = CharPositionInLine;
   return eof;
  }
  state.token = null;
  state.channel = TokenChannels.Default;
  state.tokenStartCharIndex = input.Index;
  state.tokenStartCharPositionInLine = input.CharPositionInLine;
  state.tokenStartLine = input.Line;
  state.text = null;
  try
  {
   int m = input.Mark();
   state.backtracking=1;<! means we won't throw slow exception !>
   state.failed=false;
   mTokens();
   state.backtracking=0;
   <! mTokens backtracks with synpred at backtracking==2
      and we set the synpredgate to allow actions at level 1. !>
   if (state.failed)
   {
    input.Rewind(m);
    input.Consume();<! advance one char and try again !>
   }
   else
   {
    Emit();
    return state.token;
   }
  }
  catch (RecognitionException re)
  {
   // shouldn't happen in backtracking mode, but...
   ReportError(re);
   Recover(re);
  }
 }
```

```
    }

    public override void Memoize(IIntStream input, int ruleIndex, int ruleStartIndex)
    {
     if (state.backtracking > 1)
      base.Memoize(input, ruleIndex, ruleStartIndex);
    }

    public override bool AlreadyParsedRule(IIntStream input, int ruleIndex)
    {
     if (state.backtracking > 1)
      return base.AlreadyParsedRule(input, ruleIndex);

     return false;
    }
>>

actionGate() ::= "state.backtracking == 0"

filteringActionGate() ::= "state.backtracking == 1"

/** How to generate a parser */
genericParser(grammar, name, scopes, tokens, tokenNames, rules, numRules,
        bitsets, inputStreamType, superClass,
        labelType, members, rewriteElementType,
        filterMode, ASTLabelType="object") ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<ANTLRVersion>")]
[System.CLSCompliant(false)]
<parserModifier(grammar=grammar, actions=actions)> partial class <grammar.recognizerName> :
<@superClassName><superClass><@end>
{
<if(grammar.grammarIsRoot)>
 internal static readonly string[] tokenNames = new string[] {
  "\<invalid>", "\<EOR>", "\<DOWN>", "\<UP>", <tokenNames; separator=", ">
 };
<endif>
 <tokens:{it|public const int <it.name; format="id">=<it.type>;}; separator="\n">

<if(grammar.delegates)>
 // delegates
 <grammar.delegates:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
<endif>
<if(grammar.delegators)>
 // delegators
 <grammar.delegators:
   {g|private <g.recognizerName> <g:delegateName()>;}; separator="\n">
 <last(grammar.delegators):{g|private <g.recognizerName> gParent;}>
```

```
<endif>

<if(grammar.delegates)>
 public override void SetState(RecognizerSharedState state)
 {
  base.SetState(state);
  <grammar.delegates:{g|<g:delegateName()>.SetState(state);}; separator="\n">
 }

<if(TREE_PARSER)>
 public override void SetTreeNodeStream(ITreeNodeStream input)
 {
  base.SetTreeNodeStream(input);
  <grammar.delegates:{g|<g:delegateName()>.SetTreeNodeStream(input);}; separator="\n">
 }
<endif>
<endif>

 <scopes:{it|<if(it.isDynamicGlobalScope)><globalAttributeScope(scope=it)><endif>}>
 <@members()>

 public override string[] TokenNames { get { return
<grammar.composite.rootGrammar.recognizerName>.tokenNames; } }
 public override string GrammarFileName { get { return "<fileName>"; } }

 <members>

 [Conditional("ANTLR_TRACE")]
 protected virtual void OnCreated() {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void EnterRule(string ruleName, int ruleIndex) {}
 [Conditional("ANTLR_TRACE")]
 protected virtual void LeaveRule(string ruleName, int ruleIndex) {}

 #region Rules
 <rules; separator="\n">
 #endregion Rules

<if(grammar.delegatedRules)>
<! generate rule/method definitions for imported rules so they
 appear to be defined in this recognizer. !>
 #region Delegated rules
<grammar.delegatedRules:{ruleDescriptor|
 <ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)>
<ruleDescriptor.name; format="id">(<ruleDescriptor.parameterScope:parameterScope()>) <!throws
RecognitionException !>{ <if(ruleDescriptor.hasReturnValue)>return
<endif><ruleDescriptor.grammar:delegateName()>.<ruleDescriptor.name;
format="id">(<if(ruleDescriptor.parameterScope)><ruleDescriptor.parameterScope.attributes:{a|<a.name;
```

```
format="id">}; separator=", "><endif>); \}}; separator="\n">
 #endregion Delegated rules
<endif>

 <insertSynpreds(synpreds)>

<if(cyclicDFAs)>
 #region DFA
 <cyclicDFAs:{dfa | private DFA<dfa.decisionNumber> dfa<dfa.decisionNumber>;}; separator="\n">

 protected override void InitDFAs()
 {
 base.InitDFAs();
 <cyclicDFAs:{dfa | dfa<dfa.decisionNumber> = new DFA<dfa.decisionNumber>( this<if(dfa.specialStateSTs)>,
SpecialStateTransition<dfa.decisionNumber><endif> );}; separator="\n">
 }

 <cyclicDFAs:cyclicDFA()><! dump tables for all DFA !>
 #endregion DFA
<endif>

<if(bitsets)>
 #region Follow sets
 private static class Follow
 {
 <bitsets:{it|<bitset(name={_<it.name>_in_<it.inName><it.tokenIndex>}, words64=it.bits)>}; separator="\n">
 }
 #endregion Follow sets
<endif>
}
>>

 @genericParser.members() ::= <<
#if ANTLR_DEBUG
private static readonly bool[] decisionCanBacktrack =
 new bool[]
 {
 false, // invalid decision
 <grammar.decisions:{d | <d.dfa.hasSynPred>}; wrap="\n", separator=", ">
 };
#else
private static readonly bool[] decisionCanBacktrack = new bool[0];
#endif
<! WARNING. bug in ST: this is cut-n-paste into Dbg.stg !>
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType>
input<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : this(input, new RecognizerSharedState()<grammar.delegators:{g|, <g:delegateName()>}>)
 {
```

```
}
<actions.(actionScope).ctorModifier; null="public"> <grammar.recognizerName>(<inputStreamType> input,
RecognizerSharedState state<grammar.delegators:{g|, <g.recognizerName> <g:delegateName()>}>)
 : base(input, state)
{
<if(grammar.directDelegates)>
 <grammar.directDelegates:
  {g|<g:delegateName()> = new <g.recognizerName>(input, state<trunc(g.delegators):{p|, <p:delegateName()>}>,
this);}; separator="\n">
<endif>
<if(grammar.indirectDelegates)>
 <grammar.indirectDelegates:{g | <g:delegateName()> = <g.delegator:delegateName()>.<g:delegateName()>;};
separator="\n">
<endif>
<if(grammar.delegators)>
 <last(grammar.delegators):{g|gParent = <g:delegateName()>;}>
<endif>
 <parserCtorBody()>
 OnCreated();
}
>>

// imported grammars are 'public' (can't be internal because their return scope classes must be accessible)
parserModifier(grammar, actions) ::= <<
<if(grammar.grammarIsRoot)><actions.(actionScope).modifier; null="public"><else>public<endif>
>>

parserCtorBody() ::= <<
<if(memoize)>
<if(grammar.grammarIsRoot)>
this.state.ruleMemo = new System.Collections.Generic.Dictionary\<int,
int>[<length(grammar.allImportedRules)>+1];<\n><! index from 1..n !>
<endif>
<endif>
<grammar.delegators:
{g|this.<g:delegateName()> = <g:delegateName()>;}; separator="\n">
>>

parser(grammar, name, scopes, tokens, tokenNames, rules, numRules, bitsets,
    ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Parser
<endif>}, labelType="IToken",
    members={<actions.parser.members>}) ::= <<
<genericParser(inputStreamType="ITokenStream", rewriteElementType="IToken", ...)>
>>

/** How to generate a tree parser; same as parser except the input
 *  stream is a different type.
```

```
*/
treeParser(grammar, name, scopes, tokens, tokenNames, globalAction, rules,
        numRules, bitsets, filterMode, labelType={<ASTLabelType>}, ASTLabelType="object",
superClass={<if(actions.(actionScope).superClass)><actions.(actionScope).superClass><else>Antlr.Runtime.Tree.<
if(filterMode)><if(buildAST)>TreeRewriter<else>TreeFilter<endif><else>TreeParser<endif><endif>},
        members={<actions.treeparser.members>}) ::= <<
<genericParser(inputStreamType="ITreeNodeStream", rewriteElementType="Node", ...)>
>>


/** A simpler version of a rule template that is specific to the imaginary
 * rules created for syntactic predicates.  As they never have return values
 * nor parameters etc..., just give simplest possible method.  Don't do
 * any of the normal memoization stuff in here either; it's a waste.
 * As predicates cannot be inlined into the invoking rule, they need to
 * be in a rule by themselves.
 */
synpredRule(ruleName, ruleDescriptor, block, description, nakedBlock) ::=
<<
[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>_fragment() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>_fragment() {}

// $ANTLR start <ruleName>
<ruleModifier(grammar,ruleDescriptor)> void
<ruleName>_fragment(<ruleDescriptor.parameterScope:parameterScope()>)
{
 <ruleLabelDefs()>
 EnterRule_<ruleName>_fragment();
 EnterRule("<ruleName>_fragment", <ruleDescriptor.index>);
 TraceIn("<ruleName>_fragment", <ruleDescriptor.index>);
 try
 {
  <block>
 }
 finally
 {
  TraceOut("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule("<ruleName>_fragment", <ruleDescriptor.index>);
  LeaveRule_<ruleName>_fragment();
 }
}
// $ANTLR end <ruleName>
>>

insertLexerSynpreds(synpreds) ::= <<
<insertSynpreds(synpreds)>
>>
```

```
insertSynpreds(synpreds) ::= <<
<if(synpreds)>
#region Synpreds
private bool EvaluatePredicate(System.Action fragment)
{
 bool success = false;
 state.backtracking++;
 <@start()>
 try { DebugBeginBacktrack(state.backtracking);
 int start = input.Mark();
 try
 {
  fragment();
 }
 catch ( RecognitionException re )
 {
  System.Console.Error.WriteLine("impossible: "+re);
 }
 success = !state.failed;
 input.Rewind(start);
 } finally { DebugEndBacktrack(state.backtracking, success); }
 <@stop()>
 state.backtracking--;
 state.failed=false;
 return success;
}
#endregion Synpreds
<endif>
>>


ruleMemoization(name) ::= <<
<if(memoize)>
if (state.backtracking > 0 && AlreadyParsedRule(input, <ruleDescriptor.index>)) { <returnFromRule()> }
<endif>
>>


/** How to test for failure and return from rule */
checkRuleBacktrackFailure() ::= <<
<if(backtracking)>if (state.failed) <returnFromRule()><endif>
>>


/** This rule has failed, exit indicating failure during backtrack */
ruleBacktrackFailure() ::= <<
<if(backtracking)>if (state.backtracking>0) {state.failed=true; <returnFromRule()>}<endif>
>>


ruleWrapperMap ::= [
```

```
"bottomup":{<ruleWrapperBottomup()>},
"topdown":{<ruleWrapperTopdown()>},
default:""
]

ruleWrapperBottomup() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Bottomup() { return bottomup(); }
<endif>
>>

ruleWrapperTopdown() ::= <<
<if(TREE_PARSER && filterMode)>
protected override <if(buildAST)>IAstRuleReturnScope<else>void<endif> Topdown() { return topdown(); }
<endif>
>>

/** How to generate code for a rule.  This includes any return type
 *  data aggregates required for multiple return values.
 */
rule(ruleName,ruleDescriptor,block,emptyRule,description,exceptions,finally,memoize) ::= <<
<ruleAttributeScope(scope=ruleDescriptor.ruleScope)>
<returnScope(ruleDescriptor.returnScope)>

[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>() {}
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() {}
<ruleWrapperMap.(ruleName)>
// $ANTLR start "<ruleName>"
// <fileName>:<description>
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> <returnType(ruleDescriptor)> <ruleName;
format="id">(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
  <ruleScopeSetUp()>
  <ruleDeclarations()>
  <ruleLabelDefs()>
  <ruleDescriptor.actions.init>
 try { DebugEnterRule(GrammarFileName, "<ruleName>");
 DebugLocation(<ruleDescriptor.tree.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 <@preamble()>
 try
 {
 <ruleMemoization(name=ruleName)>
```

```
 <block>
 <ruleCleanUp()>
 <(ruleDescriptor.actions.after):execAction()>
 }
<if(exceptions)>
 <exceptions:{e|<catch(decl=e.decl,action=e.action)><\n>}>
<else>
<if(!emptyRule)>
<if(actions.(actionScope).rulecatch)>
 <actions.(actionScope).rulecatch>
<else>
 catch (RecognitionException re)
 {
 ReportError(re);
 Recover(input,re);
 <@setErrorReturnValue()>
 }
<endif>
<endif>
<endif>
 finally
 {
 TraceOut("<ruleName>", <ruleDescriptor.index>);
 LeaveRule("<ruleName>", <ruleDescriptor.index>);
 LeaveRule_<ruleName>();
    <memoize()>
    <ruleScopeCleanUp()>
    <finally>
  }
 DebugLocation(<ruleDescriptor.EORNode.line>, <ruleDescriptor.EORNode.charPositionInLine>);
 } finally { DebugExitRule(GrammarFileName, "<ruleName>"); }
<@postamble()>
 <returnFromRule()><\n>
 }
// $ANTLR end "<ruleName>"
>>


// imported grammars need to have internal rules
ruleModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>internal<endif>
>>


// imported grammars need to have public return scopes
returnScopeModifier(grammar,ruleDescriptor) ::= <<
<if(grammar.grammarIsRoot)><csharpVisibilityMap.(ruleDescriptor.modifier);
null="private"><else>public<endif>
>>
```

```
catch(decl,action) ::= <<
catch (<e.decl>)
{
 <e.action>
}
>>


ruleDeclarations() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<returnType(ruleDescriptor)> retval = new <returnType(ruleDescriptor)>();
retval.Start = (<labelType>)input.LT(1);
<elseif(ruleDescriptor.returnScope)>
<ruleDescriptor.returnScope.attributes:{ a |
<a.type> <a.name; format="id"> = <if(a.initValue)><a.initValue><else><initValue(a.type)><endif>;
}>
<endif>
<if(memoize)>
int <ruleDescriptor.name>_StartIndex = input.Index;
<endif>
>>


ruleScopeSetUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_stack.Push(new <it>_scope());<it>_scopeInit(<it>_stack.Peek());};
separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_stack.Push(new
<it.name>_scope());<it.name>_scopeInit(<it.name>_stack.Peek());}; separator="\n">
>>


ruleScopeCleanUp() ::= <<
<ruleDescriptor.useScopes:{it|<it>_scopeAfter(<it>_stack.Peek());<it>_stack.Pop();}; separator="\n">
<ruleDescriptor.ruleScope:{it|<it.name>_scopeAfter(<it.name>_stack.Peek());<it.name>_stack.Pop();};
separator="\n">
>>


ruleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,ruleDescriptor.tokenListLabels,ruleDescriptor.wildcardTreeLabels,ruleDescriptor.wil
dcardTreeListLabels]
  :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<ruleDescriptor.tokenListLabels
  :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<[ruleDescriptor.ruleListLabels,ruleDescriptor.wildcardTreeListLabels]
  :{it|List\<<ASTLabelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.ruleLabels:ruleLabelDef(); separator="\n">
<ruleDescriptor.ruleListLabels:ruleLabelDef(); separator="\n">
```

```
>>

lexerRuleLabelDefs() ::= <<
<[ruleDescriptor.tokenLabels,
 ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleLabels]
  :{it|<labelType> <it.label.text> = default(<labelType>);}; separator="\n"
>
<[ruleDescriptor.charListLabels,
 ruleDescriptor.charLabels]
 :{it|int <it.label.text> = 0;}; separator="\n"
>
<[ruleDescriptor.tokenListLabels,
 ruleDescriptor.ruleListLabels]
  :{it|List\<<labelType>\> list_<it.label.text> = null;}; separator="\n"
>
<ruleDescriptor.charListLabels:{it|List\<int> list_<it.label.text> = null;}; separator="\n"
>
>>

returnFromRule() ::= <%
return
<if(!ruleDescriptor.isSynPred)>
<if(ruleDescriptor.hasReturnValue)>
<if(ruleDescriptor.hasSingleReturnValue)>
<! This comment is a hack to make sure the following
  single space appears in the output. !> <ruleDescriptor.singleValueReturnName>
<else>
<!!> retval
<endif>
<endif>
<endif>
;
%>

ruleCleanUp() ::= <<
<if(ruleDescriptor.hasMultipleReturnValues)>
<if(!TREE_PARSER)>
retval.Stop = (<labelType>)input.LT(-1);
<endif>
<endif>
>>

memoize() ::= <<
<if(memoize)>
<if(backtracking)>
if (state.backtracking > 0) { Memoize(input, <ruleDescriptor.index>, <ruleDescriptor.name>_StartIndex); }
<endif>
```

```
<endif>
>>

/** How to generate a rule in the lexer; naked blocks are used for
 *  fragment rules.
 */
lexerRule(ruleName,nakedBlock,ruleDescriptor,block,memoize) ::= <<

[Conditional("ANTLR_TRACE")]
protected virtual void EnterRule_<ruleName>() { }
[Conditional("ANTLR_TRACE")]
protected virtual void LeaveRule_<ruleName>() { }

// $ANTLR start "<ruleName>"
[GrammarRule("<ruleName>")]
<ruleModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> void
m<ruleName>(<ruleDescriptor.parameterScope:parameterScope()>)
{
 EnterRule_<ruleName>();
 EnterRule("<ruleName>", <ruleDescriptor.index>);
 TraceIn("<ruleName>", <ruleDescriptor.index>);
  <ruleScopeSetUp()>
  <ruleDeclarations()>
 try
 {
<if(nakedBlock)>
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
<else>
 int _type = <ruleName>;
 int _channel = DefaultTokenChannel;
 <ruleMemoization(name=ruleName)>
 <lexerRuleLabelDefs()>
 <ruleDescriptor.actions.init>
 <block>
 <ruleCleanUp()>
 state.type = _type;
 state.channel = _channel;
 <(ruleDescriptor.actions.after):execAction()>
<endif>
 }
 finally
 {
 TraceOut("<ruleName>", <ruleDescriptor.index>);
 LeaveRule("<ruleName>", <ruleDescriptor.index>);
 LeaveRule_<ruleName>();
```

```
        <ruleScopeCleanUp()>
        <memoize()>
    }
}
// $ANTLR end "<ruleName>"
>>


/** How to generate code for the implicitly-defined lexer grammar rule
 *  that chooses between lexer rules.
 */
tokensRule(ruleName,nakedBlock,args,block,ruleDescriptor) ::= <<

public override void mTokens()
{
 <block><\n>
}
>>


// S U B R U L E S

/** A (...) subrule with multiple alternatives */
block(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterSubRule(<decisionNumber>);
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
<@prebranch()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
} finally { DebugExitSubRule(<decisionNumber>); }
<@postbranch()>
>>


/** A rule block with multiple alternatives */
ruleBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::= <<
// <fileName>:<description>
int alt<decisionNumber>=<maxAlt>;
<decls>
<@predecision()>
try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
<decision>
```

```
} finally { DebugExitDecision(<decisionNumber>); }
<@postdecision()>
switch (alt<decisionNumber>)
{
<alts:{a|<altSwitchCase(i,a)>}>
}
>>

ruleBlockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A special case of a (...) subrule with a single alternative */
blockSingleAlt(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,description) ::= <<
// <fileName>:<description>
<decls>
<@prealt()>
DebugEnterAlt(1);
<alts>
<@postalt()>
>>

/** A (..)+ block with 1 or more alternatives */
positiveClosureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,descriptio
n) ::= <<
// <fileName>:<description>
int cnt<decisionNumber>=0;
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch (alt<decisionNumber>)
 {
 <alts:{a|<altSwitchCase(i,a)>}>
 default:
  if (cnt<decisionNumber> >= 1)
```

```
  goto loop<decisionNumber>;


 <ruleBacktrackFailure()>
 EarlyExitException eee<decisionNumber> = new EarlyExitException( <decisionNumber>, input );
 DebugRecognitionException(eee<decisionNumber>);
 <@earlyExitException()>
 throw eee<decisionNumber>;
 }
 cnt<decisionNumber>++;
 }
loop<decisionNumber>:
 ;


 } finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>


positiveClosureBlockSingleAlt ::= positiveClosureBlock


/** A (..)* block with 1 or more alternatives */
closureBlock(alts,decls,decision,enclosingBlockLevel,blockLevel,decisionNumber,maxK,maxAlt,description) ::=
<<
// <fileName>:<description>
<decls>
<@preloop()>
try { DebugEnterSubRule(<decisionNumber>);
while (true)
{
 int alt<decisionNumber>=<maxAlt>;
 <@predecision()>
 try { DebugEnterDecision(<decisionNumber>, decisionCanBacktrack[<decisionNumber>]);
 <decision>
 } finally { DebugExitDecision(<decisionNumber>); }
 <@postdecision()>
 switch ( alt<decisionNumber> )
 {
<alts:{a|<altSwitchCase(i,a)>}>
 default:
  goto loop<decisionNumber>;
 }
}


loop<decisionNumber>:
 ;


 } finally { DebugExitSubRule(<decisionNumber>); }
<@postloop()>
>>
```

closureBlockSingleAlt ::= closureBlock

/** Optional blocks (x)? are translated to (x|) by before code generation
 * so we can just use the normal block template
 */
optionalBlock ::= block

optionalBlockSingleAlt ::= block

/** A case in a switch that jumps to an alternative given the alternative
 * number. A DFA predicts the alternative and then a simple switch
 * does the jump to the code that actually matches that alternative.
 */
altSwitchCase(altNum,alt) ::= <<
case <altNum>:
 <@prealt()>
 DebugEnterAlt(<altNum>);
 <alt>
 break;<\n>
>>

/** An alternative is just a list of elements; at outermost level */
alt(elements,altNum,description,autoAST,outerAlt,treeLevel,rew) ::= <<
// <fileName>:<description>
{
<@declarations()>
<elements:element()>
<rew>
<@cleanup()>
}
>>

/** What to emit when there is no rewrite. For auto build
 * mode, does nothing.
 */
noRewrite(rewriteBlockLevel, treeLevel) ::= ""

// E L E M E N T S

/** Dump the elements one per line */
element(it) ::= <%
<@prematch()>
DebugLocation(<it.line>, <it.pos>);<\n>
<it.el><\n>
%>

/** match a token optionally with a label in front */

```
tokenRef(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)><label>=(<labelType>)<endif>Match(input,<token>,Follow._<token>_in_<ruleName><elementIndex>);
<checkRuleBacktrackFailure()>
>>

/** ids+=ID */
tokenRefAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<tokenRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

listLabelElem(label,elem,elemType) ::= <<
if (list_<label>==null) list_<label>=new List\<<elemType; null={<labelType>}>\>();
list_<label>.Add(<elem>);<\n>
>>

/** match a character */
charRef(char,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
Match(<char>); <checkRuleBacktrackFailure()>
>>

/** match a character range */
charRangeRef(a,b,label) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchRange(<a>,<b>); <checkRuleBacktrackFailure()>
>>

/** For now, sets are interval tests and must be tested inline */
matchSet(s,label,elementIndex,postmatchCode="",terminalOptions={}) ::= <<
<if(label)>
<matchSetLabel()>
<endif>
if (<s>)
{
 input.Consume();
 <postmatchCode>
 <if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
}
else
{
 <ruleBacktrackFailure()>
 MismatchedSetException mse = new MismatchedSetException(null,input);
 DebugRecognitionException(mse);
```

```
<@mismatchedSetException()>
<if(LEXER)>
Recover(mse);
throw mse;
<else>
throw mse;
<! use following code to make it recover inline; remove throw mse;
recoverFromMismatchedSet(input,mse,Follow._set_in_<ruleName><elementIndex>);
!>
<endif>
}<\n>
>>


matchSetUnchecked(s,label,elementIndex,postmatchCode=false) ::= <%
<if(label)>
<matchSetLabel()><\n>
<endif>
input.Consume();<\n>
<if(postmatchCode)>
<postmatchCode><\n>
<endif>
<if(!LEXER)>state.errorRecovery=false;<endif><if(backtracking)>state.failed=false;<endif>
%>


matchSetLabel() ::= <%
<if(LEXER)>
<label>= input.LA(1);
<else>
<label>=(<labelType>)input.LT(1);
<endif>
%>


matchRuleBlockSet ::= matchSet

matchSetAndListLabel(s,label,elementIndex,postmatchCode) ::= <<
<matchSet(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** Match a string literal */
lexerStringRef(string,label,elementIndex) ::= <%
<if(label)>
int <label>Start = CharIndex;<\n>
Match(<string>); <checkRuleBacktrackFailure()><\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start, CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
```

```
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(<string>); <checkRuleBacktrackFailure()><\n>
<endif>
%>


wildcard(token,label,elementIndex,terminalOptions={}) ::= <<
<if(label)>
<label>=(<labelType>)input.LT(1);<\n>
<endif>
MatchAny(input); <checkRuleBacktrackFailure()>
>>


wildcardAndListLabel(token,label,elementIndex,terminalOptions={}) ::= <<
<wildcard(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match . wildcard in lexer */
wildcardChar(label, elementIndex) ::= <<
<if(label)>
<label> = input.LA(1);<\n>
<endif>
MatchAny(); <checkRuleBacktrackFailure()>
>>


wildcardCharListLabel(label, elementIndex) ::= <<
<wildcardChar(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>


/** Match a rule reference by invoking it possibly with arguments
 *  and a return value or values.  The 'rule' argument was the
 *  target rule name, but now is type Rule, whose toString is
 *  same: the rule name.  Now though you can access full rule
 *  descriptor stuff.
 */
ruleRef(rule,label,elementIndex,args,scope) ::= <<
PushFollow(Follow._<rule.name>_in_<ruleName><elementIndex>);
<if(label)><label>=<endif><if(scope)><scope:delegateName()>.<endif><rule.name; format="id">(<args;
separator=", ">);
PopFollow();
<checkRuleBacktrackFailure()>
>>


/** ids+=r */
ruleRefAndListLabel(rule,label,elementIndex,args,scope) ::= <<
<ruleRef(...)>
```

```
<listLabelElem(elem=label,elemType={<ASTLabelType>},...)>
>>

/** A lexer rule reference.
 *
 * The 'rule' argument was the target rule name, but now
 * is type Rule, whose toString is same: the rule name.
 * Now though you can access full rule descriptor stuff.
 */
lexerRuleRef(rule,label,args,elementIndex,scope) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()><\n>
<label> = new <labelType>(input, TokenTypes.Invalid, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
<if(scope)><scope:delegateName()>.<endif>m<rule.name>(<args; separator=", ">);
<checkRuleBacktrackFailure()>
<endif>
%>

/** i+=INT in lexer */
lexerRuleRefAndListLabel(rule,label,args,elementIndex,scope) ::= <<
<lexerRuleRef(...)>
<listLabelElem(elem=label,elemType=labelType,...)>
>>

/** EOF in the lexer */
lexerMatchEOF(label,elementIndex) ::= <%
<if(label)>
int <label>Start<elementIndex> = CharIndex;<\n>
int <label>StartLine<elementIndex> = Line;<\n>
int <label>StartCharPos<elementIndex> = CharPositionInLine;<\n>
Match(EOF); <checkRuleBacktrackFailure()><\n>
<labelType> <label> = new <labelType>(input, EOF, TokenChannels.Default, <label>Start<elementIndex>,
CharIndex-1);<\n>
<label>.Line = <label>StartLine<elementIndex>;<\n>
<label>.CharPositionInLine = <label>StartCharPos<elementIndex>;
<else>
Match(EOF); <checkRuleBacktrackFailure()>
<endif>
%>
```

```
// used for left-recursive rules
recRuleDefArg()                    ::= "int <recRuleArg()>"
recRuleArg()                  ::= "_p"
recRuleAltPredicate(ruleName,opPrec)  ::= "<recRuleArg()> \<= <opPrec>"
recRuleSetResultAction()          ::= "root_0=$<ruleName>_primary.tree;"
recRuleSetReturnAction(src,name)     ::= "$<name>=$<src>.<name>;"


/** match ^(root children) in tree parser */
tree(root, actionsAfterRoot, children, nullableChildList,
    enclosingTreeLevel, treeLevel) ::= <<
<root:element()>
<actionsAfterRoot:element()>
<if(nullableChildList)>
if (input.LA(1) == TokenTypes.Down)
{
 Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
 <children:element()>
 Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
}
<else>
Match(input, TokenTypes.Down, null); <checkRuleBacktrackFailure()>
<children:element()>
Match(input, TokenTypes.Up, null); <checkRuleBacktrackFailure()>
<endif>
>>


/** Every predicate is used as a validating predicate (even when it is
 *  also hoisted into a prediction expression).
 */
validateSemanticPredicate(pred,description) ::= <<
if (!(<evalPredicate(...)>))
{
 <ruleBacktrackFailure()>
 throw new FailedPredicateException(input, "<ruleName>", "<description>");
}
>>


// F i x e d  D F A  (if-then-else)


dfaState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
<if((!isTrue.(last(edges).labelExpr)) && (!last(edges).predicates))>
else
{
<if(eotPredictsAlt)>
 alt<decisionNumber> = <eotPredictsAlt>;
<else>
```

```
 <ruleBacktrackFailure()>
 NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
 DebugRecognitionException(nvae);
 <@noViableAltException()>
 throw nvae;
<endif>
}
<endif>
>>


/** Same as a normal DFA state except that we don't examine lookahead
 *  for the bypass alternative.  It delays error detection but this
 *  is faster, smaller, and more what people expect.  For (X)? people
 *  expect "if ( LA(1)==X ) match(X);" and that's it.
 */
dfaOptionalBlockState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse ">
>>


/** A DFA state that is actually the loopback decision of a closure
 *  loop.  If end-of-token (EOT) predicts any of the targets then it
 *  should act like a default clause (i.e., no error can be generated).
 *  This is used only in the lexer so that for ('a')* on the end of a rule
 *  anything other than 'a' predicts exiting.
 */
dfaLoopbackState(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
int LA<decisionNumber>_<k> = input.LA(<k>);<\n>
<edges; separator="\nelse "><\n>
<if(eotPredictsAlt)>
<if(!edges)>
alt<decisionNumber> = <eotPredictsAlt>;<! if no edges, don't gen ELSE !>
<else>
else
{
 alt<decisionNumber> = <eotPredictsAlt>;
}<\n>
<endif>
<endif>
>>


/** An accept state indicates a unique alternative has been predicted */
dfaAcceptState(alt) ::= "alt<decisionNumber> = <alt>;"


/** A simple edge with an expression.  If the expression is satisfied,
 *  enter to the target state.  To handle gated productions, we may
 *  have to evaluate some predicates for this edge.
```

```
*/
dfaEdge(labelExpr, targetState, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>)
{
 <targetState>
}
>>

// F i x e d  D F A  (switch case)

/** A DFA state where a SWITCH may be generated.  The code generator
 *  decides if this is possible: CodeGenerator.canGenerateSwitch().
 */
dfaStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
default:
<if(eotPredictsAlt)>
 alt<decisionNumber>=<eotPredictsAlt>;
 break;<\n>
<else>
 {
  <ruleBacktrackFailure()>
  NoViableAltException nvae = new NoViableAltException("<description>", <decisionNumber>, <stateNumber>,
input, <k>);
  DebugRecognitionException(nvae);
  <@noViableAltException()>
  throw nvae;
 }
<endif>
}<\n>
>>

dfaOptionalBlockStateSwitch(k,edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
}<\n>
>>

dfaLoopbackStateSwitch(k, edges,eotPredictsAlt,description,stateNumber,semPredState) ::= <<
switch (input.LA(<k>))
{
<edges; separator="\n">
<if(eotPredictsAlt)>
default:
 alt<decisionNumber>=<eotPredictsAlt>;
```

```
break;<\n>
<endif>
}<\n>
>>


dfaEdgeSwitch(labels, targetState) ::= <<
<labels:{it|case <it>:}; separator="\n">
    {
    <targetState>
    }
    break;
>>
```

// C y c l i c D F A

```
/** The code to initiate execution of a cyclic DFA; this is used
 *  in the rule to predict an alt just like the fixed DFA case.
 *  The <name> attribute is inherited via the parser, lexer, ...
 */
dfaDecision(decisionNumber,description) ::= <<
try
{
    alt<decisionNumber> = dfa<decisionNumber>.Predict(input);
}
catch (NoViableAltException nvae)
{
    DebugRecognitionException(nvae);
    throw;
}
>>


/* Dump DFA tables as run-length-encoded Strings of octal values.
 * Can't use hex as compiler translates them before compilation.
 * These strings are split into multiple, concatenated strings.
 * Java puts them back together at compile time thankfully.
 * Java cannot handle large static arrays, so we're stuck with this
 * encode/decode approach.  See analysis and runtime DFA for
 * the encoding methods.
 */
cyclicDFA(dfa) ::= <<
private class DFA<dfa.decisionNumber> : DFA
{
    private const string DFA<dfa.decisionNumber>_eotS =
        "<dfa.javaCompressedEOT; wrap="\"+\n\t\t\"">";
    private const string DFA<dfa.decisionNumber>_eofS =
        "<dfa.javaCompressedEOF; wrap="\"+\n\t\t\"">";
    private const string DFA<dfa.decisionNumber>_minS =
        "<dfa.javaCompressedMin; wrap="\"+\n\t\t\"">";
```

```
 private const string DFA<dfa.decisionNumber>_maxS =
  "<dfa.javaCompressedMax; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_acceptS =
  "<dfa.javaCompressedAccept; wrap="\"+\n\t\t\"">";
 private const string DFA<dfa.decisionNumber>_specialS =
  "<dfa.javaCompressedSpecial; wrap="\"+\n\t\t\"">}>";
 private static readonly string[] DFA<dfa.decisionNumber>_transitionS =
  {
   <dfa.javaCompressedTransition:{s|"<s; wrap="\"+\n\"">"}; separator=",\n">
  };

 private static readonly short[] DFA<dfa.decisionNumber>_eot =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eotS);
 private static readonly short[] DFA<dfa.decisionNumber>_eof =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_eofS);
 private static readonly char[] DFA<dfa.decisionNumber>_min =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_minS);
 private static readonly char[] DFA<dfa.decisionNumber>_max =
DFA.UnpackEncodedStringToUnsignedChars(DFA<dfa.decisionNumber>_maxS);
 private static readonly short[] DFA<dfa.decisionNumber>_accept =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_acceptS);
 private static readonly short[] DFA<dfa.decisionNumber>_special =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_specialS);
 private static readonly short[][] DFA<dfa.decisionNumber>_transition;

 static DFA<dfa.decisionNumber>()
 {
  int numStates = DFA<dfa.decisionNumber>_transitionS.Length;
  DFA<dfa.decisionNumber>_transition = new short[numStates][];
  for ( int i=0; i \< numStates; i++ )
  {
   DFA<dfa.decisionNumber>_transition[i] =
DFA.UnpackEncodedString(DFA<dfa.decisionNumber>_transitionS[i]);
  }
 }

 public DFA<dfa.decisionNumber>( BaseRecognizer recognizer<if(dfa.specialStateSTs)>,
SpecialStateTransitionHandler specialStateTransition<endif> )
<if(dfa.specialStateSTs)>
 : base(specialStateTransition)
<endif>
 {
  this.recognizer = recognizer;
  this.decisionNumber = <dfa.decisionNumber>;
  this.eot = DFA<dfa.decisionNumber>_eot;
  this.eof = DFA<dfa.decisionNumber>_eof;
  this.min = DFA<dfa.decisionNumber>_min;
  this.max = DFA<dfa.decisionNumber>_max;
```

```
    this.accept = DFA<dfa.decisionNumber>_accept;
    this.special = DFA<dfa.decisionNumber>_special;
    this.transition = DFA<dfa.decisionNumber>_transition;
    }

    public override string Description { get { return "<dfa.description>"; } }

    public override void Error(NoViableAltException nvae)
    {
     DebugRecognitionException(nvae);
    }
}<\n>
<if(dfa.specialStateSTs)>
private int SpecialStateTransition<dfa.decisionNumber>(DFA dfa, int s, IIntStream _input)<! throws
NoViableAltException!>
{
 <if(LEXER)>
 IIntStream input = _input;
 <endif>
 <if(PARSER)>
 ITokenStream input = (ITokenStream)_input;
 <endif>
 <if(TREE_PARSER)>
 ITreeNodeStream input = (ITreeNodeStream)_input;
 <endif>
int _s = s;
s = -1;
<! pull these outside the switch cases to save space on locals !>
int LA<dfa.decisionNumber>_1 = input.LA(1);
int index<dfa.decisionNumber>_1 = input.Index;
switch (_s)
{
<dfa.specialStateSTs:{state |case <i0>:<! compressed special state numbers 0..n-1 !>
<state>}; separator="\n">

 default:
 break;
 }

 if (s >= 0)
 return s;

<if(backtracking)>
 if (state.backtracking > 0) {state.failed=true; return -1;}
<endif>
 NoViableAltException nvae = new NoViableAltException(dfa.Description, <dfa.decisionNumber>, _s, input);
 dfa.Error(nvae);
 throw nvae;
```

```
}
<endif>
>>


/** A state in a cyclic DFA; it's a special state and part of a big switch on
 *  state.
 */
cyclicDFAState(decisionNumber,stateNumber,edges,needErrorClause,semPredState) ::= <<
{
<if(semPredState)>
 <! get next lookahead symbol to test edges, then rewind !>
 input.Rewind();
<endif>
 <edges; separator="\nelse ">
<if(semPredState)>
 <! return input cursor to state before we rewound !>
 input.Seek(index<decisionNumber>_1);
<endif>
 break;
}
>>


/** Just like a fixed DFA edge, test the lookahead and indicate what
 *  state to jump to next if successful.
 */
cyclicDFAEdge(labelExpr, targetStateNumber, edgeNumber, predicates) ::= <<
if ((<labelExpr>)<if(predicates)> && (<predicates>)<endif>) {s = <targetStateNumber>;}<\n>
>>


/** An edge pointing at end-of-token; essentially matches any char;
 *  always jump to the target.
 */
eotDFAEdge(targetStateNumber,edgeNumber, predicates) ::= <<
s = <targetStateNumber>;<\n>
>>



// D F A   E X P R E S S I O N S


andPredicates(left,right) ::= "(<left>&&<right>)"


orPredicates(operands) ::= "(<operands; separator=\"||\">)"


notPredicate(pred) ::= "!(<evalPredicate(...)>)"


evalPredicate(pred,description) ::= "(<pred>)"


evalSynPredicate(pred,description) ::= "EvaluatePredicate(<pred>_fragment)"
```

lookaheadTest(atom,k,atomAsInt) ::= "LA<decisionNumber>_<k>==<atom>"

/** Sometimes a lookahead test cannot assume that LA(k) is in a temp variable
 * somewhere. Must ask for the lookahead directly.
 */
isolatedLookaheadTest(atom,k,atomAsInt) ::= "input.LA(<k>)==<atom>"

lookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::= <%
(LA<decisionNumber>_<k><ge()><lower> && LA<decisionNumber>_<k><le()><upper>)
%>

isolatedLookaheadRangeTest(lower,upper,k,rangeNumber,lowerAsInt,upperAsInt) ::=
"(input.LA(<k>)<ge()><lower> && input.LA(<k>)<le()><upper>)"

le() ::= "\<="
ge() ::= ">="

setTest(ranges) ::= <<
<ranges; separator="||">
>>

// A T T R I B U T E S

attributeScope(scope) ::= <<
<if(scope)>
<if(scope.attributes)>
protected sealed partial class <scope.name>_scope
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
}
<if(scope.actions.scopeinit)>
protected void <scope.name>_scopeInit(<scope.name>_scope scope)
{
 <scope.actions.scopeinit>
}
<else>
protected virtual void <scope.name>_scopeInit(<scope.name>_scope scope) {}
<endif>
<if(scope.actions.scopeafter)>
protected void <scope.name>_scopeAfter(<scope.name>_scope scope)
{
 <scope.actions.scopeafter>
}
<else>
protected virtual void <scope.name>_scopeAfter(<scope.name>_scope scope) {}
<endif>
protected readonly ListStack\<<scope.name>_scope> <scope.name>_stack = new

```
ListStack\<<scope.name>_scope>();
<endif>
<endif>
>>


globalAttributeScope(scope) ::= <<
<attributeScope(...)>
>>


ruleAttributeScope(scope) ::= <<
<attributeScope(...)>
>>


returnStructName(it) ::= "<it.name>_return"


returnType(ruleDescriptor) ::= <%
<if(ruleDescriptor.returnScope.attributes && ruleDescriptor.hasMultipleReturnValues)>
 <ruleDescriptor.grammar.recognizerName>.<ruleDescriptor:returnStructName()>
<elseif(ruleDescriptor.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(ruleDescriptor.hasSingleReturnValue)>
 <ruleDescriptor.singleValueReturnType>
<else>
 void
<endif>
%>


/** Generate the C# type associated with a single or multiple return
 *  values.
 */
ruleLabelType(referencedRule) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
 <ruleReturnBaseType()>
<elseif(referencedRule.hasSingleReturnValue)>
 <referencedRule.singleValueReturnType>
<else>
 void
<endif>
%>


delegateName(it) ::= <<
<if(it.label)><it.label><else>g<it.name><endif>
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
```

```
default(<typeName>)
>>

/** Define a rule label including default value */
ruleLabelDef(label) ::= <%
<ruleLabelType(referencedRule=label.referencedRule)> <label.label.text> =
<initValue(typeName=ruleLabelType(referencedRule=label.referencedRule))>;
%>


/** Define a return struct for a rule if the code needs to access its
 *  start/stop tokens, tree stuff, attributes, ...  Leave a hole for
 *  subgroups to stick in members.
 */
returnScope(scope) ::= <<
<if(scope.attributes && ruleDescriptor.hasMultipleReturnValues)>
<returnScopeModifier(grammar=grammar,ruleDescriptor=ruleDescriptor)> sealed partial class
<ruleDescriptor:returnStructName()> : <ruleReturnBaseType()><@ruleReturnInterfaces()>
{
 <scope.attributes:{it|public <it.decl>;}; separator="\n">
 <@ruleReturnMembers()>
}
<endif>
>>


ruleReturnBaseType() ::= <%
<if(TREE_PARSER)>Tree<else>Parser<endif>RuleReturnScope\<<labelType>>
%>


@returnScope.ruleReturnMembers() ::= <<
>>


parameterScope(scope) ::= <<
<scope.attributes:{it|<it.decl>}; separator=", ">
>>


parameterAttributeRef(attr) ::= <<
<attr.name; format="id">
>>


parameterSetAttributeRef(attr,expr) ::= <<
<attr.name; format="id"> =<expr>;
>>


scopeAttributeRef(scope,attr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id">
<else>
<if(index)>
```

```
<scope>_stack[<index>].<attr.name; format="id">
<else>
<scope>_stack.Peek().<attr.name; format="id">
<endif>
<endif>
%>


scopeSetAttributeRef(scope,attr,expr,index,negIndex) ::= <%
<if(negIndex)>
<scope>_stack[<scope>_stack.Count - <negIndex> - 1].<attr.name; format="id"> = <expr>;
<else>
<if(index)>
<scope>_stack[<index>].<attr.name; format="id"> = <expr>;
<else>
<scope>_stack.Peek().<attr.name; format="id"> = <expr>;
<endif>
<endif>
%>


/** $x is either global scope or x is rule with dynamic scope; refers
 *  to stack itself not top of stack.  This is useful for predicates
 *  like {$function.Count>0 && $function::name.Equals("foo")}?
 */
isolatedDynamicScopeRef(scope) ::= "<scope>_stack"


/** reference an attribute of rule; might only have single return value */
ruleLabelRef(referencedRule,scope,attr) ::= <%
<if(referencedRule.hasMultipleReturnValues)>
(<scope>!=null?((<returnType(referencedRule)>)<scope>).<attr.name; format="id">:<initValue(attr.type)>)
<else>
<scope>
<endif>
%>


returnAttributeRef(ruleDescriptor,attr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id">
<else>
<attr.name; format="id">
<endif>
%>


returnSetAttributeRef(ruleDescriptor,attr,expr) ::= <%
<if(ruleDescriptor.hasMultipleReturnValues)>
retval.<attr.name; format="id"> =<expr>;
<else>
<attr.name; format="id"> =<expr>;
<endif>
```

```
%>

/** How to translate $tokenLabel */
tokenLabelRef(label) ::= "<label>"

/** ids+=ID {$ids} or e+=expr {$e} */
listLabelRef(label) ::= "list_<label>"



// not sure the next are the right approach

tokenLabelPropertyRef_text(scope,attr) ::= "(<scope>!=null?<scope>.Text:default(string))"
tokenLabelPropertyRef_type(scope,attr) ::= "(<scope>!=null?<scope>.Type:0)"
tokenLabelPropertyRef_line(scope,attr) ::= "(<scope>!=null?<scope>.Line:0)"
tokenLabelPropertyRef_pos(scope,attr) ::= "(<scope>!=null?<scope>.CharPositionInLine:0)"
tokenLabelPropertyRef_channel(scope,attr) ::= "(<scope>!=null?<scope>.Channel:0)"
tokenLabelPropertyRef_index(scope,attr) ::= "(<scope>!=null?<scope>.TokenIndex:0)"
tokenLabelPropertyRef_tree(scope,attr) ::= "<scope>_tree"
tokenLabelPropertyRef_int(scope,attr) ::= "(<scope>!=null?int.Parse(<scope>.Text):0)"

ruleLabelPropertyRef_start(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Start):default(<labelType>))"
ruleLabelPropertyRef_stop(scope,attr) ::= "(<scope>!=null?((<labelType>)<scope>.Stop):default(<labelType>))"
ruleLabelPropertyRef_tree(scope,attr) ::=
"(<scope>!=null?((<ASTLabelType>)<scope>.Tree):default(<ASTLabelType>))"
ruleLabelPropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
(<scope>!=null?(input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(<scope>.Start),
 input.TreeAdaptor.GetTokenStopIndex(<scope>.Start))):default(string))
<else>
(<scope>!=null?input.ToString(<scope>.Start,<scope>.Stop):default(string))
<endif>
%>

ruleLabelPropertyRef_st(scope,attr) ::= "(<scope>!=null?<scope>.Template:null)"

/** Isolated $RULE ref ok in lexer as it's a Token */
lexerRuleLabel(label) ::= "<label>"

lexerRuleLabelPropertyRef_type(scope,attr) ::=
  "(<scope>!=null?<scope>.Type:0)"

lexerRuleLabelPropertyRef_line(scope,attr) ::=
  "(<scope>!=null?<scope>.Line:0)"

lexerRuleLabelPropertyRef_pos(scope,attr) ::=
  "(<scope>!=null?<scope>.CharPositionInLine:-1)"
```

```
lexerRuleLabelPropertyRef_channel(scope,attr) ::=
  "(<scope>!=null?<scope>.Channel:0)"

lexerRuleLabelPropertyRef_index(scope,attr) ::=
  "(<scope>!=null?<scope>.TokenIndex:0)"

lexerRuleLabelPropertyRef_text(scope,attr) ::=
  "(<scope>!=null?<scope>.Text:default(string))"

lexerRuleLabelPropertyRef_int(scope,attr) ::=
  "(<scope>!=null?int.Parse(<scope>.Text):0)"

// Somebody may ref $template or $tree or $stop within a rule:
rulePropertyRef_start(scope,attr) ::= "retval.Start"
rulePropertyRef_stop(scope,attr) ::= "retval.Stop"
rulePropertyRef_tree(scope,attr) ::= "retval.Tree"
rulePropertyRef_text(scope,attr) ::= <%
<if(TREE_PARSER)>
input.TokenStream.ToString(
 input.TreeAdaptor.GetTokenStartIndex(retval.Start),
 input.TreeAdaptor.GetTokenStopIndex(retval.Start))
<else>
input.ToString(retval.Start,input.LT(-1))
<endif>
%>
rulePropertyRef_st(scope,attr) ::= "retval.Template"

lexerRulePropertyRef_text(scope,attr) ::= "Text"
lexerRulePropertyRef_type(scope,attr) ::= "_type"
lexerRulePropertyRef_line(scope,attr) ::= "state.tokenStartLine"
lexerRulePropertyRef_pos(scope,attr) ::= "state.tokenStartCharPositionInLine"
lexerRulePropertyRef_index(scope,attr) ::= "-1" // undefined token index in lexer
lexerRulePropertyRef_channel(scope,attr) ::= "_channel"
lexerRulePropertyRef_start(scope,attr) ::= "state.tokenStartCharIndex"
lexerRulePropertyRef_stop(scope,attr) ::= "(CharIndex-1)"
lexerRulePropertyRef_int(scope,attr) ::= "int.Parse(<scope>.Text)"

// setting $st and $tree is allowed in local rule. everything else
// is flagged as error
ruleSetPropertyRef_tree(scope,attr,expr) ::= "retval.Tree = <expr>;"
ruleSetPropertyRef_st(scope,attr,expr) ::= "retval.Template =<expr>;"

/** How to execute an action (only when not backtracking) */
execAction(action) ::= <%
<if(backtracking)>
if (<actions.(actionScope).synpredgate>)<\n>
{<\n>
<@indentedAction()><\n>
```

```
}
<else>
<action>
<endif>
%>


@execAction.indentedAction() ::= <<
 <action>
>>


/** How to always execute an action even when backtracking */
execForcedAction(action) ::= "<action>"


// M I S C (properties, etc...)


bitset(name, words64) ::= <<
public static readonly BitSet <name> = new BitSet(new ulong[]{<words64:{it|<it>UL};separator=",">});
>>


codeFileExtension() ::= ".cs"


true_value() ::= "true"
false_value() ::= "false"


isTrue ::= [
 "true" : true,
 default : false
]
```

Found in path(s):
* /opt/cola/permits/1274703855_1645234694.1/0/antlr-3-5-2-sources-
jar/org/antlr/codegen/templates/CSharp2/CSharp2.stg

1.3 java-architecture-for-xml-binding 2.3.3

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Amendment II

A well regulated militia, being necessary to the security of a free state, the right of the people to keep and bear arms, shall not be infringed.

Amendment III

No soldier shall, in time of peace be quartered in any house, without the consent of the owner, nor in time of war, but in a manner to be prescribed by law.

Amendment IV

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

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1.6 bean-validation-api 2.0.1

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1.7 square-retrofit 2.3.0

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* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/Platform.java

* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/HTTP.java

* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/PUT.java

* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/Header.java

* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/Part.java

* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/Headers.java

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* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/GET.java

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* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/Query.java

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* /opt/cola/permits/1354022839_1658977252.178297/0/retrofit-2-3-0-sources-jar/retrofit2/http/Streaming.java
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1.8 okhttp 3.8.0

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jar/okhttp3/internal/connection/RouteSelector.java

* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/Dns.java

* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/OkHttpClient.java

* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/internal/http2/Ping.java

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jar/okhttp3/internal/http2/Http2Codec.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/Address.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/internal/Util.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-
jar/okhttp3/internal/http/HttpHeaders.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-
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jar/okhttp3/internal/http/HttpMethod.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/CertificatePinner.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/internal/Version.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/FormBody.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/RequestBody.java
* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-jar/okhttp3/Interceptor.java
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jar/okhttp3/internal/http/RealInterceptorChain.java

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jar/okhttp3/internal/platform/JdkWithJettyBootPlatform.java

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jar/okhttp3/internal/cache2/Relay.java

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jar/okhttp3/internal/platform/AndroidPlatform.java

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jar/okhttp3/internal/platform/Jdk9Platform.java

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jar/okhttp3/internal/http/UnrepeatableRequestBody.java

* /opt/cola/permits/1354023289_1656537228.8747616/0/okhttp-3-8-0-sources-1-
jar/okhttp3/internal/http2/ConnectionShutdownException.java

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1.11 jersey-media-jaxb 2.25.1

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1.12 junit-platform-junit-platform-engine 1.8.2

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1.13 antlr 2.7.7

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1.14 dropwizard-test-helpers 1.3.23

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1.15 jackson-databind 2.10.3

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1.16 powermock-module-junit4 2.0.0

1.16.1 Available under license :

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Found in path(s):
* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-
jar/org/powermock/modules/junit4/internal/impl/DelegatingPowerMockRunner.java
* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-
jar/org/powermock/modules/junit4/PowerMockRunnerDelegate.java
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jar/org/powermock/modules/junit4/internal/impl/NotificationBuilder.java
* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-
jar/org/powermock/modules/junit4/internal/impl/PowerMockRunNotifier.java
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* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-jar/org/powermock/modules/junit4/internal/impl/PowerMockJUnit44RunnerDelegateImpl.java

* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-jar/org/powermock/modules/junit4/PowerMockRunner.java

* /opt/cola/permits/1136978699_1613989596.43/0/powermock-module-junit4-2-0-0-sources-1-jar/org/powermock/modules/junit4/internal/impl/testcaseworkaround/PowerMockJUnit4MethodValidator.java

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1.17 asm 9.2

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* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/package.html
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* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/RecordComponentWriter.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ClassTooLargeException.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/FieldVisitor.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Frame.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Context.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/MethodTooLargeException.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Label.java
* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Type.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ClassWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/MethodWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ClassReader.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/signature/SignatureWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/RecordComponentVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ClassVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/SymbolTable.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Handle.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/AnnotationVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ModuleWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/FieldWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/signature/SignatureReader.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/MethodVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Edge.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ByteVector.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/signature/SignatureVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Handler.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Symbol.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/TypePath.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Constants.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ConstantDynamic.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Attribute.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/AnnotationWriter.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/Opcodes.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/CurrentFrame.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/ModuleVisitor.java

* /opt/cola/permits/1221704254_1635458831.0/0/asm-9-2-sources-2-jar/org/objectweb/asm/TypeReference.java

1.18 java-semver 0.9.0

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* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/UnexpectedCharacterException.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/LexerException.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/package-info.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Greater.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Expression.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/MetadataVersion.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/VersionParser.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/NormalVersion.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Not.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/ExpressionParser.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/package-info.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/util/package-info.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/util/Stream.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/UnexpectedTokenException.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Less.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/LessOrEqual.java
* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-

jar/com/github/zafarkhaja/semver/expr/Equal.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/NotEqual.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/GreaterOrEqual.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Lexer.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/CompositeExpression.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/ParseException.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/And.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/expr/Or.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/Parser.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/Version.java

* /opt/cola/permits/1274705241_1645234225.55/0/java-semver-0-9-0-sources-jar/com/github/zafarkhaja/semver/util/UnexpectedElementException.java

1.19 hypersql-database-engine 2.3.2

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jar/org/hsqldb/util/preprocessor/LineType.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Parser.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Defines.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/AntResolver.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Token.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/PreprocessorAntTask.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Preprocessor.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Document.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/IResolver.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/PreprocessorException.java
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jar/org/hsqldb/util/preprocessor/Tokenizer.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/Line.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/preprocessor/BasicResolver.java
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*/
/* These are commands which may contain nested commands and/or which
  * require the closing semicolon to sent to the DB engine.
  * The BEGIN and DECLARE needed for PL/SQL probably do not need to
  * terminate the line, as we have it specified here, but I'd rather not be
  * too liberal with proprietary SQL like this, because it's easy to
  * envision other proprietary or non-proprietary commands beginning with
  * DECLARE or BEGIN. */

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/**
 * Comprehensive information about the database as a whole.
 * <P>
 * This interface is implemented by driver vendors to let users know the capabilities
 * of a Database Management System (DBMS) in combination with
 * the driver based on JDBC^{TM} technology
 * ("JDBC driver") that is used with it. Different relational DBMSs often support
 * different features, implement features in different ways, and use different
 * data types. In addition, a driver may implement a feature on top of what the
 * DBMS offers. Information returned by methods in this interface applies
 * to the capabilities of a particular driver and a particular DBMS working
 * together. Note that as used in this documentation, the term "database" is
 * used generically to refer to both the driver and DBMS.
 * <P>
 * A user for this interface is commonly a tool that needs to discover how to
 * deal with the underlying DBMS. This is especially true for applications
 * that are intended to be used with more than one DBMS. For example, a tool might use the method
 * <code>getTypeInfo</code> to find out what data types can be used in a
 * <code>CREATE TABLE</code> statement. Or a user might call the method
 * <code>supportsCorrelatedSubqueries</code> to see if it is possible to use
 * a correlated subquery or <code>supportsBatchUpdates</code> to see if it is
 * possible to use batch updates.
 * <P>
 * Some <code>DatabaseMetaData</code> methods return lists of information
 * in the form of <code>ResultSet</code> objects.
 * Regular <code>ResultSet</code> methods, such as
 * <code>getString</code> and <code>getInt</code>, can be used
 * to retrieve the data from these <code>ResultSet</code> objects. If
 * a given form of metadata is not available, an empty <code>ResultSet</code>
 * will be returned. Additional columns beyond the columns defined to be
 * returned by the <code>ResultSet</code> object for a given method
 * can be defined by the JDBC driver vendor and must be accessed

* by their <B>column label</B>.
* <P>
* Some <code>DatabaseMetaData</code> methods take arguments that are
* String patterns. These arguments all have names such as fooPattern.
* Within a pattern String, "%" means match any substring of 0 or more
* characters, and "_" means match any one character. Only metadata
* entries matching the search pattern are returned. If a search pattern
* argument is set to <code>null</code>, that argument's criterion will
* be dropped from the search.
* <P>
* A method that gets information about a feature that the driver does not
* support will throw an <code>SQLException</code>.
* In the case of methods that return a <code>ResultSet</code>
* object, either a <code>ResultSet</code> object (which may be empty) is
* returned or an <code>SQLException</code> is thrown.
*
* <!-- start release-specific documentation -->
* <div class="ReleaseSpecificDocumentation">
* <h3>HSQLDB-Specific Information:</h3> <p>
*
* <h4>Metadata Table Production</h4>
*
* Starting with HSQLDB 1.7.2, the metadata table (a.k.a system table) production
* implementation provided in the default build filters metadata based on each
* SQL session user's access rights which in turn lifts the pre-HSQLDB 1.7.2
* restriction that only users with the DBA role
* ('admin' users in older HSQLDB parlance) could expect trouble-free access to
* all metadata.<p>
*
* Also starting with HSQLDB 1.7.2, the metadata table production implementation
* classes are loaded dynamically, using a precedence policy to find and load
* the richest producer available at runtime. In the event that no better
* alternative is found, the default minimal (completely restricted) provider
* is selected. Under this scheme, it is possible for third party packagers to
* create custom distributions targeted at supporting full (design-time),
* custom-written (proprietary / micro environment), minimal (production-time)
* or completely-restricted (space-constrained | device embedded | real-time |
* hostile environment) metadata table production scenarios. To learn more
* about this option, interested parties can review the documentation and source
* code for the <code>org.hsqldb.dbinfo.DatabaseInformation class</code>.<p>
*
* Please also note that in addition to the metadata tables produced to
* directly support this class, starting with HSQLDB 1.7.2, the default build
* provides many additional tables covering all or most HSQLDB features, such
* as descriptions of the triggers and aliases defined in the database. <p>
*
* For instance, in the default build, a fairly comprehensive description of
* each INFORMATION_SCHEMA table and each INFORMATION_SCHEMA table

* column is included in the REMARKS column of the {@link #getTables(
* java.lang.String, java.lang.String, java.lang.String, java.lang.String[])
* getTables(...)} and {@link #getColumns(java.lang.String, java.lang.String,
* java.lang.String, java.lang.String) getColumns(...)} results, which derive
* from INFORMATION_SCHEMA.SYSTEM_TABLES and INFORMATION_SCHEMA.SYSTEM_COLUMNS,
* respectively.<p>
*
* <h4>Schema Metadata</h4>
*
* The SQL SCHEMA concept became fully supported in the HSQLDB 1.8.x series and
* this fact is reflected in the all subsequent versions of this class.
*
* <h4>Catalog Metadata</h4>
*
* Starting with HSQLDB 2.0, SQL standards compliance up to SQL:2008 and beyond
* is a major theme which is reflected in the provision of the majority of the
* standard-defined full-name INFORMATION_SCHEMA views. <p>
*
* However, just as CATALOG semantics and handling are still considered to be
* implementation defined by the most recent SQL standard (SQL:2008), so is the
* HSQLDB CATALOG concept still in the process of being defined and refined in
* HSQLDB 2.x. and beyond.<p>
*
* Previous to HSQLDB 2.x, there were, at various points in time, experimental
* features provided to turn on pseudo catalog (and before that, pseudo-schema)
* reporting in the system tables, using the database properties
* 'hsqldb.catalogs' and 'hsqldb.schemas', respectively.<p>
*
* However, once the engine fully supported the SQL SCHEMA concept, the
* experimental 'hsqldb.schemas' * database property was retired. <p>
*
* Similarly, starting with HSQLDB 2.x, the 'hsqldb.catalogs' database property
* has been retired and replaced with the convention that, from the perspective
* of SQL identification, an HSQLDB JDBC URL connects to a single HSQLDB
* database instance which consists of a single, default CATALOG
* named PUBLIC in which each SCHEMA instance of the database resides. The name of
* this catalog can be changed with the ALTER CATALOG <name> RENAME TO statement.
* As of version 2.1.0, HSQLDB supports qualification by the containing CATALOG of
* database objects at the syntactic level, but does not yet support operations
* such as opening, manipulating or querying against multiple database
* catalogs within a single session, not even in a one-at-a-time fashion.<p>
*
* <h4>Index Metadata</h4>
*
* It must still be noted that as of the most recent release, HSQLDB continues
* to ignore the <code>approximate</code> argument of {@link #getIndexInfo
* getIndexInfo()} which continues to be simply indicative of absence of a fully
* statistics-driven cost-based SQL plan optimization facility. When,

* such a facility is implemented, corresponding improvements to
* <code>getIndexInfo</code> will be provided. <p>
*
* <h4>Notes for developers extending metadata table production</h4>
*
* Note that in the absence of an ORDER BY clause, queries against the metadata
* tables that directly support this class are expected to return rows in JDBC
* contract order. The reason for this is that results typically come
* back much faster when no "ORDER BY" clause is used. <p>
*
* As such, when adding, extending or replacing a JDBC database metadata table
* production routine, developers need to be aware of this fact and either add the
* contract "ORDER BY" clause to the driving SQL or, when possible,
* preferably maintain rows in the contract order by correctly coding the
* primary index definition in the table producer class.<p>
*
* <hr>
*
* JRE 1.1.x Notes: <p>
*
* In general, JDBC 2 support requires Java 1.2 and above, and JDBC3 requires
* Java 1.4 and above. In HSQLDB, support for methods introduced in different
* versions of JDBC depends on the JDK version used for compiling and building
* HSQLDB.<p>
*
* Since 1.7.0, it is possible to build the product so that
* all JDBC 2 methods can be called while executing under the version 1.1.x
* Java Runtime Environment^{TM}.
* However, some of these method calls require <code>int</code> values that
* are defined only in the JDBC 2 or greater version of the
* {@link java.sql.ResultSet ResultSet} interface. For this reason, when the
* product is compiled under JDK 1.1.x, these values are defined in
* {@link JDBCResultSet JDBCResultSet}.<p>
*
* In a JRE 1.1.x environment, calling JDBC 2 methods that take or return the
* JDBC2-only <code>ResultSet</code> values can be achieved by referring
* to them in parameter specifications and return value comparisons,
* respectively, as follows: <p>
*
* <pre class="JavaCodeExample">
* JDBCResultSet.FETCH_FORWARD
* JDBCResultSet.TYPE_FORWARD_ONLY
* JDBCResultSet.TYPE_SCROLL_INSENSITIVE
* JDBCResultSet.CONCUR_READ_ONLY
* // etc
* </pre>
*
* However, please note that code written in such a manner will not be

* compatible for use with other JDBC 2 drivers, since they expect and use
* <code>ResultSet</code>, rather than <code>JDBCResultSet</code>. Also
* note, this feature is offered solely as a convenience to developers
* who must work under JDK 1.1.x due to operating constraints, yet wish to
* use some of the more advanced features available under the JDBC 2
* specification.<p>
*
* (fredt@users)
* (boucherb@users)
* </div>
* <!-- end release-specific documentation -->
*
* @author Campbell Boucher-Burnet (boucherb@users dot sourceforge.net)
* @author Fred Toussi (fredt@users dot sourceforge.net)
* @version 2.3.2
* @revised JDK 1.6, HSQLDB 2.0
* @revised JDK 1.7, HSQLDB 2.0.1
* @see org.hsqldb.dbinfo.DatabaseInformation
* @see org.hsqldb.dbinfo.DatabaseInformationMain
* @see org.hsqldb.dbinfo.DatabaseInformationFull
*/

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/TransferCommon.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/TransferTable.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/DatabaseManagerCommon.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestMerge.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestStoredProcedure.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/navigator/RowSetNavigatorDataTable.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/StatementDML.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/SimpleStore.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/Notified.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/server/Server.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/auth/HsqldbSlaveAuthBean.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestCollation.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/types/ClobDataID.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/tar/TarFileOutputStream.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/Cache.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/SessionData.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/Logger.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/types/CharacterType.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/jdbc/JDBCDataSource.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestBatchExecution.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/sqltool/Calculator.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/StatementTypes.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestJavaFunctions.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/StatementDMQL.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/RangeVariableResolver.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/SqlToolError.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestUpdatableResultSets.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/dbinfo/DatabaseInformationMain.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/InputStreamInterface.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/TransactionManagerCommon.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/rights/GranteeManager.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/HashMappedList.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/FrameworkLogger.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ExpressionColumnAccessor.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/tar/TarGenerator.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/map/ValuePool.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/DataFileCache.java

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/auth/AuthFunctionBean.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ParserRoutine.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/sqltool/Token.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RowStoreAVL.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/AppendableException.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/types/Collation.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/server/ServerConstants.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/SessionContext.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/SchemaManager.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/tar/TarReader.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestDbBackup.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ExpressionLogical.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestBug785429.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/auth/LdapAuthBeanTester.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/Expression.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RowStoreAVLDisk.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestBug808460.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/tar/TarFileInputStream.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/tar/TarReaderMain.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/TriggerDefSQL.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/rights/UserManager.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ParserCommand.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RowStoreAVLDiskData.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ParserDDL.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ParserBase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/auth/AuthBeanMultiplexer.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RowStoreAVLHybrid.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/BasicTextJdkLogFormatter.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/rowio/RowOutputInterface.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/Routine.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/CachedObjectBase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/HsqlProperties.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/LineReader.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/DatabaseManager.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/SqlToolSprayer.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/rights/User.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/index/Index.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/AbstractTestOdbc.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/PersistentStoreCollectionDatabase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/LongDeque.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/TransactionManagerMVCC.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/SqlTool.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/PersistentStoreCollectionSession.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/TableBase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/StatementSchema.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/StatementCommand.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestTextTables.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/RangeGroup.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/CountUpDownLatch.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestViewAsterisks.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/HsqlDatabaseProperties.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/dbinfo/DatabaseInformationFull.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ExpressionColumn.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/RCData.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/types/ClobInputStream.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestBase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/Scanner.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/result/ResultLob.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ExpressionArrayAggregate.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/RowAVLDiskData.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/error/ErrorCode.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/cmdline/SqlFile.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TestTextTable.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/QuerySpecification.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RowStoreAVLMemory.java
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```
\q    to Quit.
\?    lists Special Commands.
:?    lists Edit-Buffer/History commands.
*?    lists PL commands.
/?    displays help on how to set and use macros (incl. functions).
```

SPECIAL Commands begin with '\' and execute when you hit ENTER.
EDIT-BUFFER / HISTORY Commands begin with ':' and execute when you hit ENTER.
PROCEDURAL LANGUAGE commands begin with '*' and end when you hit ENTER.
MACRO executions and definitions begin with '/' and end when you hit ENTER.
All other lines comprise SQL Statements (or comments).
 SQL Statements are terminated by either unquoted ';' (which executes the
 statement), or a blank line (which moves the statement into the edit buffer
 without executing).
After turning on variable expansion with command "*" (or any other PL
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Be aware when using regular expressions on commands, that the regex.s
operate only on the command text after the * or \ prefix, if any.

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/navigator/RowIterator.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/TextFileSettings.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/HsqldbTestCase.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/ArrayListIdentity.java
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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ConstraintCore.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/jdbc/JDBCCommonDataSource.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/HsqlTimer.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/StringInputStream.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/jdbc/pool/JDBCXID.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/ObjectComparator.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/server/PgType.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/server/HsqlServerFactory.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/HsqldbTransferHelper.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/Traceable.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/ClosableByteArrayOutputStream.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/map/BaseHashMap.java
* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/rowio/RowInputBinary.java
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jar/org/hsqldb/jdbc/JDBCCallableStatement.java

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jar/org/hsqldb/lib/LongValueHashMap.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ColumnBase.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/jdbc/pool/JDBCXAResource.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/navigator/RowSetNavigatorClient.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/CSVWriter.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/cmdline/sqltool/TokenList.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/ExpressionOrderBy.java

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jar/org/hsqldb/persist/ScriptRunner.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/lib/tar/TarHeaderField.java

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jar/org/hsqldb/jdbc/pool/JDBCXADataSource.java

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jar/org/hsqldb/jdbc/JDBCConnectionEventListener.java

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jar/org/hsqldb/server/StatementPortal.java

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/sample/Testdb.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/GridSwing.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/persist/RowStoreDataChange.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/OrderedHashSet.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/types/ArrayType.java

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* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/TriggerClass.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/jdbc/JDBCUtil.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/DataAccessPointException.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/util/TransferResultSet.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/NumberSequence.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/util/JDBCTypes.java

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jar/org/hsqldb/ExpressionArithmetic.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/test/AllTests.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/TableDerived.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-
jar/org/hsqldb/persist/CachedObject.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-

jar/org/hsqldb/StatementSchemaDefinition.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/java/JavaSystem.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/jdbc/JDBCBlobClient.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/persist/RandomAccessInterface.java

* /opt/cola/permits/1045559429_1658979362.39527/0/hsqldb-2-3-2-sources-jar/org/hsqldb/lib/ReaderInputStream.java

1.20 jetty-java-based-http-1-x-http-2-servlet-websocket-server jetty-9.4.20.v20190813

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* org.eclipse.jetty.orbit:javax.security.auth.message

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* org.eclipse.jetty.orbit:javax.mail.glassfish

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The following artifacts are CDDL + GPLv2 with classpath exception.
https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api

* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modififications
are hosted at github and both modified and original are under GPL v2 with
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http://openjdk.java.net/legal/gplv2+ce.html

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org.ow2.asm:asm-commons
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org.eclipse.jetty.toolchain:jetty-schemas

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Mailing Address: 4676 Admiralty Way, Suite 520
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Point of Contact:
Full name: Gordon King
E-Mail: gordon.king@simulalabs.com
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Name: Gordon King

Positions: Chief Operational Officer

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Name	Date added
Simone Bordet	12 September 2006

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jar/org/apache/xerces/dom3/as/ASAttributeDeclaration.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DocumentAS.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DOMImplementationAS.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/NodeEditAS.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ElementEditAS.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASDataType.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASElementDeclaration.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASNotationDeclaration.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/CharacterDataEditAS.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASModel.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASObjectList.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DOMASBuilder.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/ASContentModel.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DOMASException.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DOMASWriter.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom3/as/DocumentEditAS.java
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Found in path(s):
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/DOMImplementationListImpl.java
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Found in path(s):
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/datatypes/package.html
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*/
/**
   * Checks if this content model has had its min/maxOccurs values reduced for
   * purposes of speeding up UPA. If so, this content model should not be used
   * for any purpose other than checking unique particle attribution

```
 *
 * @return a boolean that says whether this content has been compacted for UPA
 */
```

Found in path(s):
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/models/XSCMValidator.java
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 */
```

Found in path(s):
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/DateDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/DateTimeDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/MonthDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/traversers/XSDHandler.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/traversers/XSAttributeChecker.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/YearMonthDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/XSSimpleTypeDecl.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/DayDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/traversers/XSDUniqueOrKeyTraverser.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/MonthDayDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-

jar/org/apache/xerces/impl/xs/XMLSchemaValidator.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/DurationDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/AbstractDateTimeDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/traversers/XSDKeyrefTraverser.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/TimeDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/YearDV.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/XSModelGroupImpl.java
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/models/XSDFACM.java
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/**
 * DOM Level 3 LS CR - Experimental.
 * Create a new <code>LSParser</code>. The newly constructed parser may
 * then be configured by means of its <code>DOMConfiguration</code>
 * object, and used to parse documents by means of its <code>parse</code>
 * method.
 * @param mode The <code>mode</code> argument is either
 * <code>MODE_SYNCHRONOUS</code> or <code>MODE_ASYNCHRONOUS</code>, if
 * <code>mode</code> is <code>MODE_SYNCHRONOUS</code> then the
 * <code>LSParser</code> that is created will operate in synchronous
 * mode, if it's <code>MODE_ASYNCHRONOUS</code> then the
 * <code>LSParser</code> that is created will operate in asynchronous
 * mode.
 * @param schemaType An absolute URI representing the type of the schema
 * language used during the load of a <code>Document</code> using the
 * newly created <code>LSParser</code>. Note that no lexical checking
 * is done on the absolute URI. In order to create a
 * <code>LSParser</code> for any kind of schema types (i.e. the
 * LSParser will be free to use any schema found), use the value
 * <code>null</code>.
 * <p >Note: For W3C XML Schema [XML Schema Part 1]
 * , applications must use the value
 * <code>"http://www.w3.org/2001/XMLSchema"</code>. For XML DTD [XML 1.0],
 * applications must use the value
 * <code>"http://www.w3.org/TR/REC-xml"</code>. Other Schema languages
 * are outside the scope of the W3C and therefore should recommend an
 * absolute URI in order to use this method.
 * @return The newly created <code>LSParser</code> object. This
 * <code>LSParser</code> is either synchronous or asynchronous
 * depending on the value of the <code>mode</code> argument.
 * <p >Note: By default, the newly created <code>LSParser</code>
 *   does not contain a <code>DOMErrorHandler</code>, i.e. the value of
 * the "
 * error-handler" configuration parameter is <code>null</code>. However, implementations
 * may provide a default error handler at creation time. In that case,
 * the initial value of the <code>"error-handler"</code> configuration
 * parameter on the new created <code>LSParser</code> contains a
 * reference to the default error handler.
 * @exception DOMException

```
 *   NOT_SUPPORTED_ERR: Raised if the requested mode or schema type is
 *   not supported.
 */
```

Found in path(s):
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/CoreDOMImplementationImpl.java
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/w3c/dom/html/HTMLDOMImplementation.java
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/validation/ValidationManager.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/traversers/XSDGroupTraverser.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/io/ASCIIReader.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/DeferredCDATASectionImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/util/XML11Char.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/SecuritySupport.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/opti/TextImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLPostfieldElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLOptgroupElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLNoopElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/jaxp/validation/XMLSchemaFactory.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/dtd/StringDatatypeValidator.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/util/SymbolTable.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/jaxp/validation/StAXValidatorHelper.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/UnionDV.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/DocumentTypeImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/parsers/ObjectFactory.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLDoElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/PSVIErrorList.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLNoopElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/html/dom/HTMLFontElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dtd/DTDGrammarBucket.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xni/XMLDocumentFragmentHandler.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/XSDeclarationPool.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/html/dom/HTMLTableCaptionElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/util/SAXMessageFormatter.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/dom/NodeIteratorImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/parsers/DOMParserImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/xinclude/MultipleScopeNamespaceSupport.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/xs/models/CMNodeFactory.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/stax/events/ElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/util/SecurityManager.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/dv/xs/SchemaDateTimeException.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/dom/DOMStringListImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/util/DatatypeMessageFormatter.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/xs/XSAttributeGroupDefinition.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/dv/XSSimpleType.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/xs/XSFacet.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/xs/traversers/XSDNotationTraverser.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/dtd/models/CMUniOp.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/dom/PSVIElementNSImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/xs/opti/DefaultText.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/xpointer/XPointerMessageFormatter.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/parsers/AbstractXMLDocumentParser.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/dtd/XMLNSDTDValidator.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/html/dom/HTMLStyleElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/dom/TextImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/dv/xs/IDDV.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/html/dom/HTMLFrameElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/xs/PSVIProvider.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/XSDDescription.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/io/MalformedByteSequenceException.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/XSNamespaceItem.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dtd/XMLDTDValidator.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLGoElementImpl.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/XSModelGroup.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/util/LSInputListImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/models/XSEmptyCM.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/AnyAtomicDV.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/io/UTF8Reader.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dtd/XMLNotationDecl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xni/XMLAttributes.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/util/XInt.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/NamedNodeMapImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLTemplateElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-

jar/org/apache/xerces/util/AttributesProxy.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLOptionElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLBElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/util/ShadowedSymbolTable.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/parsers/SAXParser.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xni/grammars/Grammar.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/html/dom/HTMLTextAreaElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/XSModelImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/DeferredDOMImplementationImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLFieldsetElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/ObjectFactory.java

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jar/org/apache/xerces/dom/DeepNodeListImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xni/grammars/XMLGrammarLoader.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/XSAttributeDeclaration.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dtd/DTDGrammar.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/XML11NSDocumentScannerImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/parsers/XIncludeParserConfiguration.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/util/XSGrammarPool.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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jar/org/apache/xerces/impl/xs/identity/Field.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/html/dom/HTMLTableSectionElementImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-

jar/org/apache/xml/serialize/Encodings.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xpointer/XPointerErrorHandler.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/CommentImpl.java

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jar/org/apache/xerces/jaxp/validation/DraconianErrorHandler.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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jar/org/apache/xerces/impl/xs/opti/DefaultNode.java

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jar/org/apache/xerces/impl/xs/identity/Selector.java

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jar/org/apache/xerces/xs/XSException.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/XSTypeDefinition.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dtd/models/CMNode.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/AttrImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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jar/org/apache/html/dom/HTMLImageElementImpl.java

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jar/org/apache/xerces/xni/XMLDTDHandler.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/ProcessingInstructionImpl.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/util/ErrorHandlerWrapper.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLImgElement.java

* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/util/XSNamedMapImpl.java

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jar/org/apache/wml/dom/WMLSetvarElementImpl.java
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/WMLAElement.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/ValidatedInfo.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/xs/identity/KeyRef.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/wml/dom/WMLSelectElementImpl.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/xs/BaseSchemaDVFactory.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/SchemaDVFactory.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
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jar/org/apache/wml/WMLPostfieldElement.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xs/datatypes/XSQName.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/xni/grammars/XMLGrammarDescription.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/dom/NodeListCache.java
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-
jar/org/apache/xerces/impl/dv/SecuritySupport.java
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jar/org/apache/xerces/impl/msg/XMLSchemaMessages.properties
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jar/org/apache/xerces/impl/xpath/regex/message.properties
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jar/org/apache/xerces/impl/msg/JAXPValidationMessages.properties
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jar/org/apache/xerces/impl/xpath/regex/message_ja.properties

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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/msg/DOMMessages.properties
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/msg/XIncludeMessages.properties
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/msg/SAXMessages.properties
* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/msg/XMLSerializerMessages.properties
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*/
/**
   * used to check the 3 constraints against each complex type
   * (should be each model group):
   * Unique Particle Attribution, Particle Derivation (Restriction),
   * Element Declrations Consistent.
   */
```

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* /opt/cola/permits/1000067752_1649800830.18/0/xercesimpl-2-11-0-sources-1-jar/org/apache/xerces/impl/xs/XSConstraints.java

1.28 junit-platform-junit-platform-commons 1.8.2

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1.29 junit-5-bill-of-materials 5.7.2

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data class License(val name: String, val url: URI, val headerFile: File)
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1.32 json-simple 1.1.1

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* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/RetainedWith.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/Property.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/LoopTranslation.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/ObjectiveCName.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/ReflectionSupport.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/RetainedLocalRef.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/J2ObjCIncompatible.java

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jar/com/google/j2objc/annotations/Weak.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/AutoreleasePool.java

* /opt/cola/permits/1131003150_1612875443.99/0/j2objc-annotations-1-3-sources-3-
jar/com/google/j2objc/annotations/WeakOuter.java

1.36 jackson-annotations 2.13.3

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1.37 jackson-module-afterburner 2.13.3

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1.38 tap4j 4.1
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jar/org/tap4j/parser/ParserException.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/consumer/package-
info.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/consumer/TapConsumer.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/representer/Representer.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/parser/Memento.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/TestResult.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/producer/TapProducerFactory.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/BailOut.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/model/AbstractTapElementDiagnostic.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/representer/package-
info.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/util/TapVersionValues.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/producer/package-
info.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Plan.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Comment.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/parser/Parser.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/consumer/TapConsumerImpl.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/producer/TapProducer.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/TapElement.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Text.java
* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-

jar/org/tap4j/representer/TapJunitRepresenter.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Header.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/representer/RepresenterException.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/util/package-info.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Footer.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/representer/Tap13Representer.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/representer/DumperOptions.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/SkipPlan.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/Directive.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/parser/Tap13Parser.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/util/DirectiveValues.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/util/StatusValues.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/parser/package-info.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/TapResult.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/producer/ProducerException.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/consumer/TapConsumerFactory.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-
jar/org/tap4j/consumer/TapConsumerException.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/TestSet.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/model/package-info.java

* /opt/cola/permits/1354023055_1656537405.7252257/0/tap4j-4-1-sources-1-jar/org/tap4j/producer/Producer.java

1.39 jopt-simple 5.0.4

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jar/kotlin/reflect/jvm/internal/impl/builtins/functionTypes.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KClassifierImpl.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/DeserializationComponentsForJava.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/constants/CompileTimeConstant.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/JvmBuiltInsPackageFragmentProvider.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationsImpl.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/ValueDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/structure/javaElements.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/typeEnhancement/typeEnhancement.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializationConfiguration.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/JvmBuiltInsSettings.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/JvmPackageScope.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/MetadataPackageFragmentProvider.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/renderer/ClassifierNamePolicy.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaAnnotationDescriptor.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/components/JavaPropertyInitializerEvaluator.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/TypeIntersectionScope.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/utils/DFS.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/TypeProjectionBase.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/MemberSignature.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassifierDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedTypeParameterDescriptor.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AbstractDeserializedPackageFragmentProvider.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/SmartList.java
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/context.kt
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/full/KClasses.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/dynamicTypes.kt
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/ErrorType.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/suspendFunctionTypes.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/structure/ReflectJavaField.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/checker/NewCapturedType.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/config/KotlinCompilerVersion.java

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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
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* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/resolvers.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/BinaryClassAnnotationAndConstantLoaderImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KProperty1Impl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/propertiesConventionUtil.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/DescriptorSubstitutor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/MemberDeserializer.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/incremental/components/LookupLocation.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/StaticScopeForKotlinEnum.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/RuntimeTypeMapper.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/LazyJavaPackageFragment.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/annotationsForResolve.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/storage/StorageManager.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/components/ExternalAnnotationResolver.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/ReflectionObjectRenderer.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializedClassDataFinder.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ProtoContainer.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/TypeConstructor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/DeserializedDescriptorResolver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/name/FqNamesUtil.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PropertySetterDescriptorImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/name/SpecialNames.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/LazyJavaPackageFragmentProvider.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/ErrorReporter.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationArgumentVisitor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PackageFragmentDescriptorImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/AbstractReceiverValue.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotationAndConstantLoaderImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/utils/collections.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/BuiltInsBinaryVersion.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/PropertyGetterDescriptorImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/SubpackagesScope.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ImplicitClassReceiver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KProperty0Impl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorNonRoot.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/VariableDescriptorWithInitializerImpl.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/MemberDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/utils/capitalizeDecapitalize.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/VariableDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedPackageMemberScope.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/utils/addToStdlib.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/ValueParameterDescriptor.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/CompanionObjectMapping.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/platform/JavaToKotlinClassMap.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/overridingUtils.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaCallableMemberDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/ReflectJvmMapping.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/EmptyContainerForLocal.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/JavaVisibilities.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/ParameterDescriptor.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KTypeImpl.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KProperty2Impl.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/PrimitiveType.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinaryPackageSourceElement.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/LazyScopeAdapter.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedMemberScope.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/FunctionDescriptorImpl.java
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/VariableDescriptorWithAccessors.kt
* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/load/java/sources/JavaSourceElementFactory.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/functions/BuiltInFictitiousFunctionClassFactory.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/storage.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/builtins/functions/FunctionClassScope.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ModuleDescriptorImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/checker/TypeCheckingProcedureCallbacks.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/util.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinClassFinder.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/specialBuiltinMembers.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ReceiverParameterDescriptorImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/jvm/JvmClassName.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/TypeProjectionImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/SimpleFunctionDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/utils/Printer.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/IntTreePMap.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/CallableMemberDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/incremental/utils.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/FieldOverridabilityCondition.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/Named.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JvmAnnotationNames.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/AbstractBinaryClassAnnotationAndConstantLoader.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassKind.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/DeclarationDescriptorImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/FakePureImplementationsProvider.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/util/scopeUtils.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/SubstitutingScope.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/JavaClassFinder.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/KFunctionImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/SourceFile.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaPropertyDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/MemberScope.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/constants/constantValues.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/name/FqNameUnsafe.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/DeserializedPackageFragment.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/CastImplicitClassReceiver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/ValueParameterDescriptorImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/pcollections/ConsPStack.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/pcollections/MapEntry.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/name/FqName.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/JavaDescriptorUtil.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ExtensionReceiver.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/TransientReceiver.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/SupertypeLoopChecker.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/ConstUtil.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/FunctionDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/ImplicitReceiver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/ModuleClassResolver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinarySourceElement.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/CompositePackageFragmentProvider.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/JvmAnnotationNames.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/types/CompositionTypeSubstitution.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/LazyJavaAnnotations.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/KClassesJvm.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/receivers/Receiver.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/KClassImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/SerializerExtensionProtocol.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/descriptors/JavaClassDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/FunctionWithAllInvokes.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/CallableDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ReceiverParameterDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/pcollections/HashPMap.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/resolve/jvm/JavaDescriptorResolver.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotationUseSiteTarget.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ClassOrPackageFragmentDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/NoLock.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/DeclarationDescriptorWithVisibility.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/java/components/JavaResolverCache.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/load/kotlin/JvmMetadataVersion.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/storage/ObservableStorageManager.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotationAndConstantLoader.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/PackageFragmentProvider.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-jar/kotlin/reflect/jvm/internal/impl/descriptors/ScriptDescriptor.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-

jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/LazyPackageViewDescriptorImpl.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/BinaryVersion.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/ReflectionFactoryImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/DeclarationDescriptorVisitorEmptyBodies.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/BuiltInsInitializer.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/AnnotatedCallableKind.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/structure/ReflectJavaElement.kt

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jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/AbstractLazyTypeParameterDescriptor.java

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jar/kotlin/reflect/jvm/internal/ReflectProperties.java

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jar/kotlin/reflect/jvm/internal/impl/load/java/lazy/descriptors/DeclaredMemberIndex.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/java/JvmBytecodeBinaryVersion.kt

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jar/kotlin/reflect/jvm/internal/impl/resolve/scopes/ResolutionScope.kt

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jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/descriptors/DeserializedAnnotations.kt

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jar/kotlin/reflect/jvm/internal/impl/descriptors/annotations/AnnotatedImpl.java

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jar/kotlin/reflect/jvm/internal/KPropertyImpl.kt

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jar/kotlin/reflect/jvm/internal/impl/load/kotlin/KotlinJvmBinaryClass.kt

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jar/kotlin/reflect/jvm/internal/impl/resolve/constants/ConstantValueFactory.kt

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jar/kotlin/reflect/jvm/internal/impl/load/java/components/DescriptorResolverUtils.java

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jar/kotlin/reflect/jvm/internal/impl/load/java/structure/annotationArguments.kt

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jar/kotlin/reflect/jvm/internal/impl/builtins/functions/FunctionInvokeDescriptor.kt

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jar/kotlin/reflect/jvm/internal/impl/descriptors/TypeParameterDescriptor.java

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jar/kotlin/reflect/jvm/internal/impl/load/java/components/JavaAnnotationMapper.kt

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jar/kotlin/reflect/jvm/internal/impl/load/kotlin/header/ReadKotlinClassHeaderAnnotationVisitor.java

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jar/kotlin/reflect/jvm/internal/impl/utils/strings.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/ExternalOverridabilityCondition.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/builtins/DefaultBuiltIns.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/MemberComparator.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/resolve/jvm/JvmPrimitiveType.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/utils/SmartSet.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/types/Variance.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/impl/TypeParameterDescriptorImpl.java

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/serialization/deserialization/LocalClassifierTypeSettings.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/load/kotlin/JavaClassDataFinder.kt

* /opt/cola/permits/1354022221_1656537347.134285/0/kotlin-reflect-1-2-40-sources-1-
jar/kotlin/reflect/jvm/internal/impl/descriptors/PropertySetterDescriptor.java

1.41 liquibase-slf4j 2.0.0

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1.42 guava-internalfuturefailureaccess-and-internalfutures 1.0.1

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jar/com/google/common/util/concurrent/internal/InternalFutureFailureAccess.java

* /opt/cola/permits/1130987386_1612872111.26/0/failureaccess-1-0-1-sources-

jar/com/google/common/util/concurrent/internal/InternalFutures.java

1.43 apache-commons-pool 2.4.2

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1.44 checker-qual 2.11.1

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1.45 apache-httpcomponents-asyncclient 4.1.1

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==
Nori Korean Morphological Analyzer - Apache Lucene Integration
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This software includes a binary and/or source version of data from

 mecab-ko-dic-2.0.3-20170922

which can be obtained from

 https://bitbucket.org/eunjeon/mecab-ko-dic/downloads/mecab-ko-dic-2.0.3-20170922.tar.gz

The floating point precision conversion in NumericUtils.Float16Converter is derived from work by Jeroen van der Zijp, granted for use under the Apache license.

1.47 dom4j-flexible-xml-framework-for-java 1.6.1

1.47.1 Available under license :

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/*
File: ConcurrentReaderHashMap

Written by Doug Lea. Adapted and released, under explicit permission, from JDK1.2 HashMap.java and Hashtable.java which carries the following copyright:

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History:

Date   Who   What

28oct1999 dl   Created

14dec1999 dl   jmm snapshot

19apr2000 dl   use barrierLock

12jan2001 dl   public release

17nov2001 dl   Minor tunings

20may2002 dl   BarrierLock can now be serialized.

09dec2002 dl   Fix interference checks.

*/

Found in path(s):

* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-

jar/org/dom4j/tree/ConcurrentReaderHashMap.java

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* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/AttributeHelper.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/FlyweightComment.java
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* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/bean/BeanAttributeList.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/DefaultNamespace.java
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* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/dom/DOMAttributeNodeMap.java
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* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/io/OutputFormat.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/NodeFilter.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-
jar/org/dom4j/util/UserDataDocumentFactory.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-
jar/org/dom4j/io/SAXModifyContentHandler.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/VisitorSupport.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/io/SAXEventRecorder.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/SingleIterator.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/io/ElementModifier.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/DocumentType.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/FilterIterator.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/rule/Pattern.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/dtd/AttributeDecl.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/Entity.java

* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/jaxb/JAXBWriter.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/DocumentFactory.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/swing/BranchTreeNode.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/AbstractText.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/NonLazyDocumentFactory.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/dtd/InternalEntityDecl.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/ElementPath.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/Document.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/AbstractCharacterData.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/datatype/InvalidSchemaException.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/Comment.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/CharacterData.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/xpp/ProxyXmlStartTag.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/DefaultText.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/rule/Mode.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/dom/DOMDocument.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/jaxb/JAXBModifier.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/SingletonStrategy.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/SimpleSingleton.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/io/DocumentSource.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/ProcessingInstruction.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/IndexedDocumentFactory.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/DocumentException.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/dom/DOMElement.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/NamespaceStack.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/datatype/DatatypeAttribute.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/BackedList.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/AbstractDocument.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/tree/ElementQNameIterator.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/util/ProxyDocumentFactory.java
* /opt/cola/permits/1010092607_1614875665.1/0/dom4j-1-6-1-sources-3-jar/org/dom4j/XPathException.java

1.48 javabeans-activation-framework-api 1.2.2

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[subs="normal"]
....
Specification: {doctitle}

Version: {revnumber}

ifeval::["{revremark}" != ""]
Status: {revremark}
endif::[]
ifeval::["{revremark}" == ""]
Status: Final Release
endif::[]

Release: {revdate}
....

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* Project home: https://projects.eclipse.org/projects/ee4j.jaf

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Source Code

The project maintains the following source code repositories:

* https://github.com/eclipse-ee4j/jaf

Third-party Content

This project leverages the following third party content.

JUnit (4.12)

* License: Eclipse Public License

1.49 jcommander-library 1.27

1.49.1 Available under license :

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Manifest-Version: 1.0
Archiver-Version: Plexus Archiver
Created-By: 1.6.0_22 (Apple Inc.)
Built-By: cbeust
Build-Jdk: 1.6.0_22
Export-Package: com.beust.jcommander;uses:="com.beust.jcommander.conve
rters,com.beust.jcommander.internal,com.beust.jcommander.validators";
version="1.27.0",com.beust.jcommander.converters;uses:="com.beust.jco
mmander";version="1.27.0",com.beust.jcommander.defaultprovider;uses:=
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;uses:="com.beust.jcommander,com.beust.jcommander.converters";version
="1.27.0",com.beust.jcommander.validators;uses:="com.beust.jcommander
";version="1.27.0"
Bundle-Version: 1.27.0
Tool: Bnd-0.0.357
Bundle-Name: JCommander
Bnd-LastModified: 1341511572089
Bundle-ManifestVersion: 2
Bundle-Description: A Java framework to parse command line options wit
h annotations.
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bundle-SymbolicName: com.beust.jcommander
Import-Package: com.beust.jcommander;version="1.27.0",com.beust.jcomma
nder.converters;version="1.27.0",com.beust.jcommander.defaultprovider
;version="1.27.0",com.beust.jcommander.internal;version="1.27.0",com.
beust.jcommander.validators;version="1.27.0"

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* /opt/cola/permits/1023260945_1648835943.22/0/jcommander-1-27-jar/META-INF/MANIFEST.MF
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1.50 jackson-annotations 2.10.3

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1.51 logback-access-module 1.2.3

1.51.1 Available under license :

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Manifest-Version: 1.0
Export-Package: ch.qos.logback.access;version="1.2.3";uses:="ch.qos.lo gback.access.spi,ch.qos.logback.core.pattern,ch.qos.logback.core.stat us,javax.servlet.http",ch.qos.logback.access.boolex;version="1.2.3";u ses:="ch.qos.logback.access.spi,ch.qos.logback.core.boolex",ch.qos.lo gback.access.db;version="1.2.3";uses:="ch.qos.logback.access.spi,ch.q os.logback.core.db",ch.qos.logback.access.db.script;version="1.2.3",c h.qos.logback.access.filter;version="1.2.3";uses:="ch.qos.logback.cor e.filter,ch.qos.logback.core.spi",ch.qos.logback.access.html;version= "1.2.3";uses:="ch.qos.logback.access.spi,ch.qos.logback.core.html",ch .qos.logback.access.jetty;version="1.2.3";uses:="ch.qos.logback.acces s.spi,ch.qos.logback.core,ch.qos.logback.core.filter,ch.qos.logback.c ore.spi,org.eclipse.jetty.server,org.eclipse.jetty.util.component",ch .qos.logback.access.joran;version="1.2.3";uses:="ch.qos.logback.acces s.spi,ch.qos.logback.core.joran,ch.qos.logback.core.joran.spi",ch.qos .logback.access.joran.action;version="1.2.3";uses:="ch.qos.logback.co re.joran.action,ch.qos.logback.core.joran.spi,org.xml.sax",ch.qos.log back.access.net;version="1.2.3";uses:="ch.qos.logback.access,ch.qos.l ogback.access.spi,ch.qos.logback.core,ch.qos.logback.core.boolex,ch.q os.logback.core.helpers,ch.qos.logback.core.net,ch.qos.logback.core.p attern,ch.qos.logback.core.spi",ch.qos.logback.access.net.server;vers ion="1.2.3";uses:="ch.qos.logback.access.spi,ch.qos.logback.core.net.

server,ch.qos.logback.core.spi",ch.qos.logback.access.pattern;version
="1.2.3";uses:="ch.qos.logback.access.spi,ch.qos.logback.core,ch.qos.
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ck.core.status,javax.servlet,org.apache.catalina,org.apache.catalina.
connector,org.apache.catalina.valves"
Built-By: ceki
Tool: Bnd-2.4.1.201501161923
Bundle-Name: Logback Access Module
Created-By: Apache Maven Bundle Plugin
Bundle-RequiredExecutionEnvironment: JavaSE-1.6
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.6))"
Bundle-Vendor: QOS.ch
Build-Jdk: 1.7.0_80
Bundle-Version: 1.2.3
Bnd-LastModified: 1491020894768
Bundle-ManifestVersion: 2
Bundle-License: http://www.eclipse.org/legal/epl-v10.html, http://www.
gnu.org/licenses/old-licenses/lgpl-2.1.html
Bundle-Description: logback-access module
Bundle-SymbolicName: ch.qos.logback.access
Bundle-DocURL: http://www.qos.ch
Import-Package: javax.servlet;version="2.5";resolution:=optional,javax
.servlet.http;version="2.5";resolution:=optional,javax.management;res
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.sift;version="[1.2,2)",ch.qos.logback.core.spi;version="[1.2,2)",ch.
qos.logback.core.status;version="[1.2,2)",ch.qos.logback.core.util;ve
rsion="[1.2,2)",org.apache.coyote;resolution:=optional,org.xml.sax,ch
.qos.logback.core.rolling;version="[1.2,2)",ch.qos.logback.core.rolli
ng.helper;version="[1.2,2)"
Originally-Created-By: Apache Maven Bundle Plugin
Archiver-Version: Plexus Archiver

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jar/ch/qos/logback/access/db/script/oracle.sql
* /opt/cola/permits/1274705181_1648835879.05/0/logback-access-1-2-3-
jar/ch/qos/logback/access/db/script/msSQLServer.sql
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#
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This SQL script creates the required tables by ch.qos.logback.access.db.DBAppender
#
It is intended for IBM DB2 databases.
#
WARNING WARNING WARNING WARNING
================================
This SQL script has not been tested on an actual DB2
instance. It may contain errors or even invalid SQL
statements.

DROP TABLE access_event_header;
DROP TABLE access_event;

CREATE TABLE access_event
 (
  timestmp   BIGINT NOT NULL,
  requestURI   VARCHAR(254),
  requestURL   VARCHAR(254),
  remoteHost   VARCHAR(254),

```
    remoteUser      VARCHAR(254),
    remoteAddr       VARCHAR(254),
    protocol        VARCHAR(254),
    method          VARCHAR(254),
    serverName       VARCHAR(254),
    postContent      VARCHAR(254),
    event_id         INTEGER GENERATED ALWAYS AS IDENTITY (START WITH 1)
);

CREATE TABLE access_event_header
 (
    event_id      INTEGER NOT NULL,
    header_key       VARCHAR(254) NOT NULL,
    header_value      VARCHAR(1024),
    PRIMARY KEY(event_id, header_key),
    FOREIGN KEY (event_id) REFERENCES access_event(event_id)
);
```

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```
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# This SQL script creates the required tables by ch.qos.logback.access.db.DBAppender.
#
# It is intended for MySQL databases. It has been tested on MySQL 5.5.31 with
# INNODB tables.


BEGIN;
DROP TABLE IF EXISTS access_event_header;
DROP TABLE IF EXISTS access_event;
COMMIT;

BEGIN;
CREATE TABLE access_event
 (
    timestmp        BIGINT NOT NULL,
    requestURI       VARCHAR(254),
    requestURL        VARCHAR(254),
    remoteHost       VARCHAR(254),
    remoteUser       VARCHAR(254),
    remoteAddr        VARCHAR(254),
```

```
  protocol       VARCHAR(254),
  method         VARCHAR(254),
  serverName       VARCHAR(254),
  postContent        VARCHAR(254),
  event_id        BIGINT NOT NULL AUTO_INCREMENT PRIMARY KEY
 );
COMMIT;

BEGIN;
CREATE TABLE access_event_header
 (
  event_id      BIGINT NOT NULL,
  header_key       VARCHAR(254) NOT NULL,
  header_value      VARCHAR(1024),
  PRIMARY KEY(event_id, header_key),
  FOREIGN KEY (event_id) REFERENCES access_event(event_id)
 );
COMMIT;
```

Found in path(s):
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jar/ch/qos/logback/access/db/script/mysql.sql
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```
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# This SQL script creates the required tables by ch.qos.logback.access.db.DBAppender
#
# It is intended for HSQL databases.


DROP TABLE access_event_header IF EXISTS;
DROP TABLE access_event IF EXISTS;

CREATE TABLE access_event (
 timestmp BIGINT NOT NULL,
 requestURI VARCHAR(254),
 requestURL VARCHAR(254),
 remoteHost VARCHAR(254),
 remoteUser VARCHAR(254),
 remoteAddr VARCHAR(254),
 protocol VARCHAR(254),
 method VARCHAR(254),
 serverName VARCHAR(254),
```

```
   postContent VARCHAR(254),
  event_id BIGINT NOT NULL IDENTITY);


CREATE TABLE access_event_header (
 event_id BIGINT NOT NULL,
 header_key  VARCHAR(254) NOT NULL,
 header_value LONGVARCHAR,
 PRIMARY KEY(event_id, header_key),
 FOREIGN KEY (event_id) REFERENCES access_event(event_id));
```

Found in path(s):
* /opt/cola/permits/1274705181_1648835879.05/0/logback-access-1-2-3-
jar/ch/qos/logback/access/db/script/hsqldb.sql
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#
# It is intended for PostgreSQL databases.

DROP TABLE    access_event_exception;
DROP SEQUENCE access_event_id_seq;
DROP TABLE    access_event;

CREATE SEQUENCE access_event_id_seq MINVALUE 1 START 1;

CREATE TABLE access_event
 (
  timestmp       BIGINT NOT NULL,
  requestURI     VARCHAR(254),
  requestURL      VARCHAR(254),
  remoteHost     VARCHAR(254),
  remoteUser     VARCHAR(254),
  remoteAddr      VARCHAR(254),
  protocol       VARCHAR(254),
  method         VARCHAR(254),
  serverName      VARCHAR(254),
  postContent     VARCHAR(254),
  event_id        BIGINT DEFAULT nextval('access_event_id_seq') PRIMARY KEY
 );

CREATE TABLE access_event_header
```

```
(
  event_id      BIGINT NOT NULL,
  header_key      VARCHAR(254) NOT NULL,
  header_value     VARCHAR(1024),
  PRIMARY KEY(event_id, header_key),
  FOREIGN KEY (event_id) REFERENCES access_event(event_id)
);
```

Found in path(s):
* /opt/cola/permits/1274705181_1648835879.05/0/logback-access-1-2-3-
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1.52 jackson-xc 2.10.3

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1.53 jacoco 0.8.8

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    Evgeny Mandrikov - initial API and implementation

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* /opt/cola/permits/1324812216_1668300253.5014505/0/jacoco-maven-plugin-0-8-8-1-jar/META-INF/m2e/lifecycle-mapping-metadata.xml

* /opt/cola/permits/1324812216_1668300253.5014505/0/jacoco-maven-plugin-0-8-8-1-jar/META-INF/maven/org.jacoco/jacoco-maven-plugin/pom.xml

1.54 kotson 2.5.0

1.54.1 Available under license :

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1.55 lucene-test-framework 9.3.0

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1.56 jna 4.1.0

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1.57 metrics-core 3.2.5

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*/

Found in path(s):
* /opt/cola/permits/1130187397_1612482190.99/0/metrics-core-3-2-5-sources-1-
jar/com/codahale/metrics/Striped64.java
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bin/viewcvs.cgi/jsr166/src/main/java/util/concurrent/ThreadLocalRandom.java?view=markup
*/

Found in path(s):
* /opt/cola/permits/1130187397_1612482190.99/0/metrics-core-3-2-5-sources-1-
jar/com/codahale/metrics/ThreadLocalRandom.java

1.58 abegocore 1.0.3

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Manifest-Version: 1.0
Bnd-LastModified: 1446804256758
Build-Jdk: 1.8.0_60
Built-By: ub
Bundle-Description: Efficient and customizable TreeLayout Algorithm in J
ava.
Bundle-DocURL: http://abego-software.de
Bundle-License: http://www.abego-software.de/legal/apl-v10.html
Bundle-ManifestVersion: 2
Bundle-Name: abego TreeLayout Core
Bundle-SymbolicName: org.abego.treelayout.core
Bundle-Vendor: abego Software GmbH, Germany
Bundle-Version: 1.0.3
Created-By: Apache Maven Bundle Plugin
Export-Package: org.abego.treelayout.util;uses:="org.abego.treelayout";v
ersion="1.0.3",org.abego.treelayout;version="1.0.3"
Implementation-Title: abego TreeLayout Core
Implementation-Vendor: abego Software GmbH, Germany
Implementation-Vendor-Id: org.abego.treelayout
Implementation-Version: 1.0.3
Import-Package: sun.misc;resolution:=optional

Specification-Title: abego TreeLayout Core
Specification-Vendor: abego Software GmbH, Germany
Specification-Version: 1.0.3
Tool: Bnd-1.50.0

Found in path(s):
* /opt/cola/permits/1162863034_1649022203.09/0/org-abego-treelayout-core-1-0-3-jar/META-INF/MANIFEST.MF

1.59 pact-jvm-pact-broker 3.5.17
1.59.1 Available under license :
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1.60 jackson-core 2.10.2
1.60.1 Available under license :
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1.61 grizzly-http-server 2.3.28

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1.63 apache-http-client 4.5.13

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1.65 nuprocess 2.0.6

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* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/internal/LibJava8.java

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* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/internal/LibC.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/windows/WinProcessFactory.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/windows/WindowsProcess.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/linux/LibEpoll.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/NuProcess.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/internal/IEventProcessor.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/osx/OsxProcess.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/NuProcessBuilder.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/NuProcessHandler.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/windows/NuKernel32.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/linux/LinProcessFactory.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/windows/ProcessCompletions.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/linux/EpollEvent.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/NuProcessFactory.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/NuAbstractProcessHandler.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/linux/LinuxProcess.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/internal/BasePosixProcess.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/linux/ProcessEpoll.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/internal/BaseEventProcessor.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/osx/LibKevent.java

* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-jar/com/zaxxer/nuprocess/osx/ProcessKqueue.java

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* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-

jar/com/zaxxer/nuprocess/codec/NuCharsetEncoderHandler.java
* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-
jar/com/zaxxer/nuprocess/codec/NuCharsetDecoderHandler.java
* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-
jar/com/zaxxer/nuprocess/codec/NuAbstractCharsetHandler.java
* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-
jar/com/zaxxer/nuprocess/internal/ReferenceCountedFileDescriptor.java
* /opt/cola/permits/1547606318_1675074521.554514/0/nuprocess-2-0-6-sources-
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jar/com/zaxxer/nuprocess/windows/WindowsCreateProcessEscape.java
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jar/com/zaxxer/nuprocess/internal/LibJava10.java

1.66 antlr-4-tool 4.6

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 */

/** How to generate rules derived from left-recursive rules.
 *  These rely on recRuleAltPredicate(),
 *  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
 *  templates in main language.stg
 */
group LeftRecursiveRules;

recRule(ruleName, argName, primaryAlts, opAlts, setResultAction,
        userRetvals, leftRecursiveRuleRefLabels) ::=
<<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
  : ( {} <primaryAlts:{alt | <alt.altText> }; separator="\n      | ">
      )
      (
        <opAlts; separator="\n      | ">
```

```
    )*
  ;
>>
```

```
recRuleAlt(alt, precOption, opPrec, pred) ::= <<
{<pred>}?\<<precOption>=<opPrec>\> <alt.altText>
>>
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/LeftRecursiveRules.stg
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*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
This file contains the default format ANTLR uses.
*/
```

```
location(file, line, column) ::= "<file>:<line>:<column>:"
```

```
message(id, text) ::= "(<id>) <text>"
```

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"

wantsSingleLineMessage() ::= "false"

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jar/org/antlr/v4/tool/templates/messages/formats/antlr.stg
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jar/org/antlr/v4/codegen/model/ElementFrequenciesVisitor.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/decl/ContextGetterDecl.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/BlockAST.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/decl/ContextTokenGetterDecl.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ScopeParser.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/SerializedATN.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/analysis/LeftRecursionDetector.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/gui/TreeTextProvider.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/ActionAST.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/automata/ATNFactory.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/analysis/LeftRecursiveRuleTransformer.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/LeftRecursiveRule.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_text.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/VisitorDispatchMethod.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_stop.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/AltBlock.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/Loop.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/MatchToken.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/OptionalBlock.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/LL1Choice.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/target/JavaScriptTarget.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/QRetValueRef.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/parse/GrammarASTAdaptor.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/semantics/SymbolChecks.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1StarBlockSingleAlt.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_text.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_start.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/StructDecl.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/semantics/SymbolCollector.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/CodeBlock.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/analysis/LeftRecursiveRuleAltInfo.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/OutputModelFactory.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/automata/ParserATNFactory.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/semantics/AttributeChecks.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/gui/SystemFontMetrics.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_text.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Choice.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_line.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1OptionalBlockSingleAlt.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/Target.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/gui/TreePostScriptGenerator.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/semantics/BasicSemanticChecks.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/GrammarTransformPipeline.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/OutputModelWalker.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Lexer.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ToolMessage.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/RuleElementAST.java
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* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextRuleGetterDecl.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextTokenListGetterDecl.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/TestSetInline.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/StarBlock.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/CodeGenPipeline.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/RuleSempredFunction.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/RuleContextDecl.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/GrammarToken.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/RuleElement.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/ActionTranslator.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ActionTemplate.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/DispatchMethod.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/AttributeDict.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/TokenDecl.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextTokenListIndexedGetterDecl.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ActionText.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Parser.java

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/RuleFunction.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_stop.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/CodeBlockForAlt.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/ast/GrammarAST.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/decl/ContextRuleListGetterDecl.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/SetAST.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/Attribute.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/ListLabelRef.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/analysis/AnalysisPipeline.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/parse/ToolANTLRParser.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/LocalRef.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_ctx.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/model/ExceptionClause.java
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/gui/TreeLayoutAdaptor.java
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```
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 */

tree grammar SourceGenTriggers;
options {
 language    = Java;
 tokenVocab  = ANTLRParser;
 ASTLabelType = GrammarAST;
}

@header {
package org.antlr.v4.codegen;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.codegen.model.*;
import org.antlr.v4.codegen.model.decl.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.Collections;
import java.util.Map;
import java.util.HashMap;
}

@members {
 public OutputModelController controller;
   public boolean hasLookaheadBlock;
   public SourceGenTriggers(TreeNodeStream input, OutputModelController controller) {
    this(input);
    this.controller = controller;
   }
}

dummy : block[null, null] ;

block[GrammarAST label, GrammarAST ebnfRoot] returns [List<? extends SrcOp> omos]
  : ^( blk=BLOCK (^(OPTIONS .+))?
   {List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();}
    ( alternative {alts.add($alternative.altCodeBlock);} )+
    )
    {
    if ( alts.size()==1 && ebnfRoot==null) return alts;
    if ( ebnfRoot==null ) {
```

```
        $omos = DefaultOutputModelFactory.list(controller.getChoiceBlock((BlockAST)$blk, alts, $label));
    }
    else {
        Choice choice = controller.getEBNFBlock($ebnfRoot, alts);
        hasLookaheadBlock |= choice instanceof PlusBlock || choice instanceof StarBlock;
        $omos = DefaultOutputModelFactory.list(choice);
    }
    }
    ;


alternative returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
    boolean outerMost = inContext("RULE BLOCK");
}
@after {
    controller.finishAlternative($altCodeBlock, $ops, outerMost);
}
    : a=alt[outerMost] {$altCodeBlock=$a.altCodeBlock; $ops=$a.ops;}
    ;


alt[boolean outerMost] returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
// set alt if outer ALT only (the only ones with alt field set to Alternative object)
    AltAST altAST = (AltAST)retval.start;
    if ( outerMost ) controller.setCurrentOuterMostAlt(altAST.alt);
}
    : {
    List<SrcOp> elems = new ArrayList<SrcOp>();
    // TODO: shouldn't we pass $start to controller.alternative()?
    $altCodeBlock = controller.alternative(controller.getCurrentOuterMostAlt(), outerMost);
    $altCodeBlock.ops = $ops = elems;
    controller.setCurrentBlock($altCodeBlock);
    }
    ^( ALT elementOptions? ( element {if ($element.omos!=null) elems.addAll($element.omos);} )+ )

    | ^(ALT elementOptions? EPSILON)
        {$altCodeBlock = controller.epsilon(controller.getCurrentOuterMostAlt(), outerMost);}
    ;


element returns [List<? extends SrcOp> omos]
    : labeledElement    {$omos = $labeledElement.omos;}
    | atom[null,false]  {$omos = $atom.omos;}
    | subrule       {$omos = $subrule.omos;}
    |  ACTION       {$omos = controller.action((ActionAST)$ACTION);}
    |  SEMPRED      {$omos = controller.sempred((ActionAST)$SEMPRED);}
    | ^(ACTION elementOptions)  {$omos = controller.action((ActionAST)$ACTION);}
    |  ^(SEMPRED elementOptions)  {$omos = controller.sempred((ActionAST)$SEMPRED);}
    ;
```

```
labeledElement returns [List<? extends SrcOp> omos]
 : ^(ASSIGN ID atom[$ID,false] )   {$omos = $atom.omos;}
 | ^(PLUS_ASSIGN ID atom[$ID,false])  {$omos = $atom.omos;}
 | ^(ASSIGN ID block[$ID,null] )   {$omos = $block.omos;}
 | ^(PLUS_ASSIGN ID block[$ID,null])  {$omos = $block.omos;}
 ;


subrule returns [List<? extends SrcOp> omos]
 : ^(OPTIONAL b=block[null,$OPTIONAL])
 {
 $omos = $block.omos;
 }
| ( ^(op=CLOSURE b=block[null,null])
 | ^(op=POSITIVE_CLOSURE b=block[null,null])
 )
 {
 List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();
 SrcOp blk = $b.omos.get(0);
 CodeBlockForAlt alt = new CodeBlockForAlt(controller.delegate);
 alt.addOp(blk);
 alts.add(alt);
 SrcOp loop = controller.getEBNFBlock($op, alts); // "star it"
    hasLookaheadBlock |= loop instanceof PlusBlock || loop instanceof StarBlock;
    $omos = DefaultOutputModelFactory.list(loop);
 }
| block[null, null]     {$omos = $block.omos;}
 ;

blockSet[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
  : ^(SET atom[label,invert]+) {$omos = controller.set($SET, $label, invert);}
  ;

/*
setElement
 : STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE STRING_LITERAL STRING_LITERAL)
 ;
*/

// TODO: combine ROOT/BANG into one then just make new op ref'ing return value of atom/terminal...
// TODO: same for NOT
atom[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
 : ^(NOT a=atom[$label, true])  {$omos = $a.omos;}
 | range[label]      {$omos = $range.omos;}
 | ^(DOT ID terminal[$label])
 | ^(DOT ID ruleref[$label])
```

```
 | ^(WILDCARD .)      {$omos = controller.wildcard($WILDCARD, $label);}
 | WILDCARD       {$omos = controller.wildcard($WILDCARD, $label);}
 |  terminal[label]     {$omos = $terminal.omos;}
 |  ruleref[label]     {$omos = $ruleref.omos;}
| blockSet[$label, invert]  {$omos = $blockSet.omos;}
 ;


ruleref[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RULE_REF ARG_ACTION? elementOptions?)  {$omos = controller.ruleRef($RULE_REF, $label,
$ARG_ACTION);}
  ;


range[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  ;


terminal[GrammarAST label] returns [List<SrcOp> omos]
  :  ^(STRING_LITERAL .)  {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | STRING_LITERAL    {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | ^(TOKEN_REF ARG_ACTION .) {$omos = controller.tokenRef($TOKEN_REF, $label, $ARG_ACTION);}
  | ^(TOKEN_REF .)   {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  | TOKEN_REF     {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  ;


elementOptions
  : ^(ELEMENT_OPTIONS elementOption+)
  ;


elementOption
  : ID
  |  ^(ASSIGN ID ID)
  |  ^(ASSIGN ID STRING_LITERAL)
  |  ^(ASSIGN ID ACTION)
  |  ^(ASSIGN ID INT)
  ;
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/codegen/SourceGenTriggers.g
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
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 *
 *  Redistribution and use in source and binary forms, with or without
```

// File   : A3Lexer.g

// Author   : Jim Idle (jimi@temporal-wave.com)

// Copyright : Free BSD - See @header clause below

// Version   : First implemented as part of ANTLR 3.2 this is the self

//   hosting ANTLR 3 Lexer.

//

// Description

// -----------

// This is the definitive lexer grammar for parsing ANTLR V3.x.x grammars. All other

// gramnmars are derived from this grammar via source code control integration (perforce)

// or by the gdiff tool.

//

// This grammar and its associated grmmmars A3Parser.g and A3Walker.g exhibit the following

// traits, which are recommended for all production quality grammars:

//

// 1) They are separate grammars, not composite grammars;

// 2) They implement all supporting methods in a superclass (at least this is recommended

//   for language targets that support inheritence;

// 3) All errors are pushed as far down the parsing chain as possible, which means

//   that the lexer tries to defer error reporting to the parser, and the parser

//   tries to defer error reporting to a semantic phase consisting of a single

//   walk of the AST. The reason for this is that the error messages produced

//   from later phases of the parse will generally have better context and so

//   be more useful to the end user. Consider the message: "Syntax error at 'options'"

//   vs: "You cannot specify two options{} sections in a single grammar file".

```
// 4) The lexer is 'programmed' to catch common mistakes such as unterminated literals
//    and report them specifically and not just issue confusing lexer mismatch errors.
//

/** Read in an ANTLR grammar and build an AST.  Try not to do
 * any actions, just build the tree.
 *
 * The phases are:
 *
 * A3Lexer.g (this file)
 *         A3Parser.g
 *         A3Verify.g (derived from A3Walker.g)
 * assign.types.g
 * define.g
 * buildnfa.g
 * antlr.print.g (optional)
 * codegen.g
 *
 * Terence Parr
 * University of San Francisco
 * 2005
 * Jim Idle (this v3 grammar)
 * Temporal Wave LLC
 * 2009
 */
lexer grammar ANTLRLexer;

// ================================================================================
// Note that while this grammar does not care about order of constructs
// that don't really matter, such as options before @header etc, it must first
// be parsed by the original v2 parser, before it replaces it. That parser does
// care about order of structures. Hence we are constrained by the v2 parser
// for at least the first bootstrap release that causes this parser to replace
// the v2 version.
// ================================================================================

// -------
// Options
//
// V3 option directives to tell the tool what we are asking of it for this
// grammar.
//
options {

 // Target language is Java, which is the default but being specific
 // here as this grammar is also meant as a good example grammar for
 // for users.
 //
```

```
    language      = Java;

    // The super class that this lexer should expect to inherit from, and
    // which contains any and all support routines for the lexer. This is
    // commented out in this baseline (definitive or normative grammar)
    // - see the ANTLR tool implementation for hints on how to use the super
    //   class
    //
    //superclass    = AbstractA3Lexer;
}

tokens { SEMPRED; TOKEN_REF; RULE_REF; LEXER_CHAR_SET; ARG_ACTION; }

// Include the copyright in this source and also the generated source
//
@lexer::header {
/*
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(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
}
```

```
@members {
 public static final int COMMENTS_CHANNEL = 2;

  public CommonTokenStream tokens; // track stream we push to; need for context info
  public boolean isLexerRule = false;

 public void grammarError(ErrorType etype, org.antlr.runtime.Token token, Object... args) { }

 /** scan backwards from current point in this.tokens list
  *  looking for the start of the rule or subrule.
  *  Return token or null if for some reason we can't find the start.
  */
 public Token getRuleOrSubruleStartToken() {
    if ( tokens==null ) return null;
  int i = tokens.index();
     int n = tokens.size();
     if ( i>=n ) i = n-1; // seems index == n as we lex
  while ( i>=0 && i<n ) {
  int ttype = tokens.get(i).getType();
  if ( ttype == LPAREN || ttype == TOKEN_REF || ttype == RULE_REF ) {
   return tokens.get(i);
  }
  i--;
  }
  return null;
 }
}

// --------
// Comments
//
// ANTLR comments can be multi or single line and we don't care
// which particularly. However we also accept Javadoc style comments
// of the form: /** ... */ and we do take care to distinguish those
// from ordinary multi-line comments
// Note how we guide the lexical PATH because we want to issue a decriptive
// error message in case of a standalone '/' character, which makes no
// sense in ANTLR source code. We alo trap unterminated multi-line comments
//
fragment DOC_COMMENT : ;
COMMENT
@init {

 // Record the start line and offsets as if we need to report an
 // unterminated comment, then we want to show the start of the comment
 // we think is broken, not the end, where people will have to try and work
 // it out themselves.
 //
```

```
    int startLine = $line;
    int offset    = getCharPositionInLine();
}
    : // Eat the first character only, then see if we have a comment
      // or something silly.
      //
      '/'  // Comment introducer

    (
        // Single line comment, possibly with embedded src/line directives
        // in a similar style to the C pre-processor, allowing generated
        // code to refer the programmer back to the original source code
        // in case of error.
        //
        '/'
        (
            (' $ANTLR')=> ' $ANTLR' SRC
          | ~(NLCHARS)*
        )

      | // Multi-line comment, which may be a documentation comment
        // if it starts /** (note that we protect against accidentaly
        // recognizing a comment /**/ as a documentation comment
        //
        '*' (
            { input.LA(2) != '/'}?=> '*' { $type = DOC_COMMENT; }
          | { true }?=>  // Required to cover all alts with predicates
          )

          // Should we support embedded multiline comments here?
          //
          (
            // Pick out end of multiline comment and exit the loop
            // if we find it.
            //
            {   !(input.LA(1) == '*' && input.LA(2) == '/') }?

              // Anything else other than the non-greedy match of
              // the comment close sequence
              //
              .
          )*
          (
            // Look for the comment terminator, but if it is accidentally
            // unterminated, then we will hit EOF, which will trigger the
            // epsilon alt and hence we can issue an error message relative
            // to the start of the unterminated multi-line comment
            //
```

```
           '*/'

        | // Unterminated comment!
          //
          {
            // ErrorManager.msg(Msg.UNTERMINATED_DOC_COMMENT, startLine, offset, $pos, startLine,
offset, $pos, (Object)null);
          }
        )

      | // There was nothing that made sense following the opening '/' and so
        // we issue an error regarding the malformed comment
        //
        {
          // TODO: Insert error message relative to comment start
          //
        }
    )
    {
      // We do not wish to pass the comments in to the parser. If you are
      // writing a formatter then you will want to preserve the comments off
      // channel, but could just skip and save token space if not.
      //
      $channel=COMMENTS_CHANNEL;
    }
  ;


ARG_OR_CHARSET
options {k=1;}
  : {isLexerRule}?=> LEXER_CHAR_SET {$type=LEXER_CHAR_SET;}
  | {!isLexerRule}?=> ARG_ACTION
    {
    $type=ARG_ACTION;
    // Set the token text to our gathered string minus outer [ ]
    String t = $text;
    t = t.substring(1,t.length()-1);
    setText(t);
    }
  ;


fragment
LEXER_CHAR_SET
  : '['
  ( '\\' ~('\r'|'\n')
  | ~('\r'|'\n'|'\\'|']')
  )*
  ']'
  ;
```

```
// --------------
// Argument specs
//
// Certain argument lists, such as those specifying call parameters
// to a rule invocation, or input parameters to a rule specification
// are contained within square brackets. In the lexer we consume them
// all at once and sort them out later in the grammar analysis.
//
fragment
ARG_ACTION
 : '['
     (
        ARG_ACTION

      | ('"')=>ACTION_STRING_LITERAL

      | ('\'')=>ACTION_CHAR_LITERAL

      | ~('['|']')
     )*

     ']'
 ;


// -------
// Actions
//
// Other than making sure to distinguish between { and } embedded
// within what we have assumed to be literals in the action code, the
// job of the lexer is merely to gather the code within the action
// (delimited by {}) and pass it to the parser as a single token.
// We know that this token will be asked for its text somewhere
// in the upcoming parse, so setting the text here to exclude
// the delimiting {} is no additional overhead.
//
ACTION
 : NESTED_ACTION
  ( '?' {$type = SEMPRED;}
   ( (WSNLCHARS* '=>') => WSNLCHARS* '=>' // v3 gated sempred
    {
    Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_GATED_SEMPRED, t);
    }
   )?
```

```
  )?
  ;

// ----------------
// Action structure
//
// Many language targets use {} as block delimiters and so we
// must recursively match {} delimited blocks to balance the
// braces. Additionally, we must make some assumptions about
// literal string representation in the target language. We assume
// that they are delimited by ' or " and so consume these
// in their own alts so as not to inadvertantly match {}.
// This rule calls itself on matching a {
//
fragment
NESTED_ACTION
@init {

// Record the start line and offsets as if we need to report an
// unterminated block, then we want to show the start of the comment
// we think is broken, not the end, where people will have to try and work
// it out themselves.
//
int startLine = getLine();
int offset    = getCharPositionInLine();
}

  : // Action and other blocks start with opening {
    //
   '{'
    (
    // And now we can match one of a number of embedded
    // elements within the action until we find a
    // } that balances the opening {. If we do not find
    // the balanced } then we will hit EOF and can issue
    // an error message about the brace that we belive to
    // be mismatched. This won't be foolproof but we will
    // be able to at least report an error against the
    // opening brace that we feel is in error and this will
    // guide the user to the correction as best we can.
    //


      // An embedded {} block
      //
      NESTED_ACTION

    | // What appears to be a literal
```

```
            //
            ACTION_CHAR_LITERAL

        | // We have assumed that the target language has C/Java
          // type comments.
          //
          COMMENT

        | // What appears to be a literal
          //
          ACTION_STRING_LITERAL

     | // What appears to be an escape sequence
       //
       ACTION_ESC

     | // Some other single character that is not
       // handled above
       //
       ~('\\'|'"'|'\''|'/'|'{'|'}')

    )*

   (
       // Correctly balanced closing brace
       //
       '}'

      | // Looks like have an imblanced {} block, report
        // with respect to the opening brace.
        //
        {
          // TODO: Report imbalanced {}
          System.out.println("Block starting  at line " + startLine + " offset " + (offset+1) + " contains imbalanced {} or
is missing a }");
        }
   )
    ;


// Keywords
// --------
// keywords used to specify ANTLR v3 grammars. Keywords may not be used as
// labels for rules or in any other context where they would be ambiguous
// with the keyword vs some other identifier
// OPTIONS, TOKENS, and CHANNELS must also consume the opening brace that captures
// their option block, as this is the easiest way to parse it separate
// to an ACTION block, despite it using the same {} delimiters.
```

```
//
OPTIONS      : 'options'  WSNLCHARS* '{'  ;
TOKENS_SPEC : 'tokens'   WSNLCHARS* '{'  ;
CHANNELS    : 'channels' WSNLCHARS* '{'  ;

IMPORT      : 'import'          ;
FRAGMENT    : 'fragment'            ;
LEXER       : 'lexer'            ;
PARSER      : 'parser'           ;
GRAMMAR     : 'grammar'            ;
TREE_GRAMMAR : 'tree' WSNLCHARS* 'grammar' ;
PROTECTED   : 'protected'          ;
PUBLIC      : 'public'           ;
PRIVATE     : 'private'           ;
RETURNS     : 'returns'           ;
LOCALS      : 'locals'           ;
THROWS      : 'throws'            ;
CATCH       : 'catch'           ;
FINALLY     : 'finally'           ;
MODE        : 'mode'            ;

// -----------
// Punctuation
//
// Character sequences used as separators, delimters, operators, etc
//
COLON       : ':'
        {
        // scan backwards, looking for a RULE_REF or TOKEN_REF.
        // which would indicate the start of a rule definition.
        // If we see a LPAREN, then it's the start of the subrule.
        // this.tokens is the token string we are pushing into, so
        // just loop backwards looking for a rule definition. Then
        // we set isLexerRule.
        Token t = getRuleOrSubruleStartToken();
        if ( t!=null ) {
            if ( t.getType()==RULE_REF ) isLexerRule = false;
            else if ( t.getType()==TOKEN_REF ) isLexerRule = true;
            // else must be subrule; don't alter context
        }
        }
        ;
COLONCOLON  : '::'            ;
COMMA       : ','            ;
SEMI        : ';'            ;
LPAREN      : '('            ;
RPAREN      : ')'            ;
RARROW      : '->'            ;
```

```
LT        : '<'          ;
GT        : '>'          ;
ASSIGN    : '='          ;
QUESTION  : '?'          ;
SYNPRED   : '=>'
    {
     Token t = new CommonToken(input, state.type, state.channel,
                   state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_SYNPRED, t);
        $channel=HIDDEN;
    }
        ;
STAR      : '*'          ;
PLUS      : '+'          ;
PLUS_ASSIGN : '+='       ;
OR        : '|'          ;
DOLLAR    : '$'          ;
DOT       : '.'          ; // can be WILDCARD or DOT in qid or imported rule ref
RANGE     : '..'         ;
AT        : '@'          ;
POUND     : '#'          ;
NOT       : '~'          ;
RBRACE    : '}'          ;

/** Allow unicode rule/token names */
ID  : a=NameStartChar NameChar*
   {
   if ( Grammar.isTokenName($a.text) ) $type = TOKEN_REF;
   else $type = RULE_REF;
   }
  ;

fragment
NameChar   :  NameStartChar
       |  '0'..'9'
       |  '_'
       |  '\u00B7'
       |  '\u0300'..'\u036F'
       |  '\u203F'..'\u2040'
       ;

fragment
NameStartChar
       :  'A'..'Z' | 'a'..'z'
       |  '\u00C0'..'\u00D6'
```

```
    |  '\u00D8'..'\u00F6'
    |  '\u00F8'..'\u02FF'
    |  '\u0370'..'\u037D'
    |  '\u037F'..'\u1FFF'
    |  '\u200C'..'\u200D'
    |  '\u2070'..'\u218F'
    |  '\u2C00'..'\u2FEF'
    |  '\u3001'..'\uD7FF'
    |  '\uF900'..'\uFDCF'
    |  '\uFDF0'..'\uFEFE'
    |  '\uFF00'..'\uFFFD'
    ; // ignores | ['\u10000-'\uEFFFF] ;
```

```
// ---------------------------
// Literals embedded in actions
//
// Note that we have made the assumption that the language used within
// actions uses the fairly standard " and ' delimiters for literals and
// that within these literals, characters are escaped using the \ character.
// There are some languages which do not conform to this in all cases, such
// as by using /string/ and so on. We will have to deal with such cases if
// if they come up in targets.
//
```

```
// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal characters. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically. While this rule is called CHAR it allows for the fact that
// some languages may use/allow ' as the string delimiter.
//
fragment
ACTION_CHAR_LITERAL
 : '\" ((('\\')=>ACTION_ESC | ~'\" )* '\"
 ;
```

```
// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal strings. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically.
//
fragment
ACTION_STRING_LITERAL
 : '"' ((('\\')=>ACTION_ESC | ~'"')* '"'
 ;
```

```
// Within literal strings and characters that are not part of the ANTLR
// syntax, we must allow for escaped character sequences so that we do not
// inadvertantly recognize the end of a string or character when the terminating
```

```
// delimiter has been esacped.
//
fragment
ACTION_ESC
 : '\\' .
 ;


// -------
// Integer
//
// Obviously (I hope) match an aribtrary long sequence of digits.
//
INT : ('0'..'9')+
  ;


// -----------
// Source spec
//
// A fragment rule for picking up information about an origrinating
// file from which the grammar we are parsing has been generated. This allows
// ANTLR to report errors against the originating file and not the generated
// file.
//
fragment
SRC : 'src' WSCHARS+ file=ACTION_STRING_LITERAL WSCHARS+ line=INT
    {
      // TODO: Add target specific code to change the source file name and current line number
      //
    }
  ;


// --------------
// Literal string
//
// ANTLR makes no disticintion between a single character literal and a
// multi-character string. All literals are single quote delimited and
// may contain unicode escape sequences of the form \uxxxx, where x
// is a valid hexadecimal number (as per Java basically).
STRING_LITERAL
  : '\'' ( ( ESC_SEQ | ~('\\'|'\''|'\r'|'\n') ) )*
    (   '\''
    |   // Unterminated string literal
        {
        Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
        t.setLine(state.tokenStartLine);
        t.setText(state.text);
        t.setCharPositionInLine(state.tokenStartCharPositionInLine);
        grammarError(ErrorType.UNTERMINATED_STRING_LITERAL, t);
```

```
              }
        )
    ;


// A valid hex digit specification
//
fragment
HEX_DIGIT : ('0'..'9'|'a'..'f'|'A'..'F') ;


// Any kind of escaped character that we can embed within ANTLR
// literal strings.
//
fragment
ESC_SEQ
  : '\\'
    (
          // The standard escaped character set such as tab, newline,
          // etc.
          //
      'b'|'t'|'n'|'f'|'r'|'\"'|'\''|'\\'

      | // A Java style Unicode escape sequence
        //
        UNICODE_ESC

      | // An illegal escape seqeunce
        //
        {
          Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-1, getCharIndex());
          t.setText(t.getText());
          t.setLine(input.getLine());
          t.setCharPositionInLine(input.getCharPositionInLine()-1);
          grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t);
        }
    )
  ;


fragment
UNICODE_ESC

@init {

 // Flag to tell us whether we have a valid number of
 // hex digits in the escape sequence
 //
 int hCount = 0;
}
  :  'u' // Leadin for unicode escape sequence
```

```
    // We now require 4 hex digits. Note though
    // that we accept any number of characters
    // and issue an error if we do not get 4. We cannot
    // use an inifinite count such as + because this
    // might consume too many, so we lay out the lexical
    // options and issue an error at the invalid paths.
    //
  (
    (
      HEX_DIGIT  { hCount++; }
       (
          HEX_DIGIT  { hCount++; }
        (
           HEX_DIGIT  { hCount++; }
          (
             // Four valid hex digits, we are good
             //
             HEX_DIGIT { hCount++; }

            | // Three valid digits
           )

          | // Two valid digits
         )

        | // One valid digit
      )
       )
      | // No valid hex digits at all
  )

  // Now check the digit count and issue an error if we need to
  //
  {
  if (hCount != 4) {
        Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-3-hCount, getCharIndex()-
1);
        t.setText(t.getText());
        t.setLine(input.getLine());
        t.setCharPositionInLine(input.getCharPositionInLine()-hCount-2);
        grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t);
  }
  }
 ;


// ----------
// Whitespace
```

```
//
// Characters and character constructs that are of no import
// to the parser and are used to make the grammar easier to read
// for humans.
//
WS
  : (
      ' '
      | '\t'
      | '\r'
      | '\n'
      | '\f'
    )+
    {$channel=HIDDEN;}
  ;


// A fragment rule for use in recognizing end of line in
// rules like COMMENT.
//
fragment
NLCHARS
  : '\n' | '\r'
  ;


// A fragment rule for recognizing traditional whitespace
// characters within lexer rules.
//
fragment
WSCHARS
  : ' ' | '\t' | '\f'
  ;


// A fragment rule for recognizing both traditional whitespace and
// end of line markers, when we don't care to distinguish but don't
// want any action code going on.
//
fragment
WSNLCHARS
  : ' ' | '\t' | '\f' | '\n' | '\r'
  ;


// This rule allows ANTLR 4 to parse grammars using the UTF-8 encoding with a
// byte order mark. Since this Unicode character doesn't appear as a token
// anywhere else in the grammar, we can simply skip all instances of it without
// problem. This rule will not break usage of \uFEFF inside a LEXER_CHAR_SET or
// STRING_LITERAL.
UnicodeBOM
  :  '\uFEFF' {skip();}
```

```
  ;

// -----------------
// Illegal Character
//
// This is an illegal character trap which is always the last rule in the
// lexer specification. It matches a single character of any value and being
// the last rule in the file will match when no other rule knows what to do
// about the character. It is reported as an error but is not passed on to the
// parser. This means that the parser to deal with the gramamr file anyway
// but we will not try to analyse or code generate from a file with lexical
// errors.
//
ERRCHAR
  : .
    {
      Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
      t.setLine(state.tokenStartLine);
      t.setText(state.text);
      t.setCharPositionInLine(state.tokenStartCharPositionInLine);
      String msg = getTokenErrorDisplay(t) + " came as a complete surprise to me";
      grammarError(ErrorType.SYNTAX_ERROR, t, msg);
      state.syntaxErrors++;
      skip();
    }
  ;
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ANTLRLexer.g
No license file was found, but licenses were detected in source scan.

```
 *  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
 *  IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
 *  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
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 *  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
 *  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
 *  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
 *  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

import "Files.stg" // All file specific stuff.

cppTypeInitMap ::= [
  "int":"0",
  "long":"0",
  "float":"0.0f",
  "double":"0.0",
  "bool":"false",
  "short":"0",
  "char":"0",
  default: "nullptr" // anything other than a primitive type is an object
]

LexerHeader(lexer, atn, actionFuncs, sempredFuncs, superClass = {antlr4::Lexer}) ::= <<
<namedActions.context>

class <file.exportMacro> <lexer.name> : public <superClass> {
public:
<if (lexer.tokens)>
 enum {
   <lexer.tokens: {k | <k> = <lexer.tokens.(k)>}; separator=", ", wrap, anchor>
 };
<endif>

<if (lexer.channels)>
 enum {
   <lexer.channels: {k | <k> = <lexer.channels.(k)>}; separator=", ", wrap, anchor>
 };
<endif>

<if (rest(lexer.modes))>
 enum {
   <rest(lexer.modes): {m | <m> = <i>,}; separator="\n", anchor>
 };
<endif>
```

```
<lexer.name>(antlr4::CharStream *input);
~<lexer.name>();

<namedActions.members>
virtual std::string getGrammarFileName() const override;
virtual const std::vector\<std::string>& getRuleNames() const override;

virtual const std::vector\<std::string>& getModeNames() const override;
virtual const std::vector\<std::string>& getTokenNames() const override; // deprecated, use vocabulary instead
virtual antlr4::dfa::Vocabulary& getVocabulary() const override;

virtual const std::vector\<uint16_t> getSerializedATN() const override;
virtual const antlr4::atn::ATN& getATN() const override;

<if (actionFuncs)>
virtual void action(antlr4::RuleContext *context, size_t ruleIndex, size_t actionIndex) override;
<endif>
<if (sempredFuncs)>
virtual bool sempred(antlr4::RuleContext *_localctx, size_t ruleIndex, size_t predicateIndex) override;
<endif>

private:
 static std::vector\<antlr4::dfa::DFA> _decisionToDFA;
 static antlr4::atn::PredictionContextCache _sharedContextCache;
 static std::vector\<std::string> _ruleNames;
 static std::vector\<std::string> _tokenNames;
 static std::vector\<std::string> _modeNames;

 static std::vector\<std::string> _literalNames;
 static std::vector\<std::string> _symbolicNames;
 static antlr4::dfa::Vocabulary _vocabulary;
<atn>

<namedActions.declarations>

// Individual action functions triggered by action() above.
<actionFuncs.values; separator="\n">

// Individual semantic predicate functions triggered by sempred() above.
<sempredFuncs.values; separator="\n">

struct Initializer {
  Initializer();
};
static Initializer _init;
};
>>
```

```
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass = {Lexer}) ::= <<
<lexer.name>::<lexer.name>(CharStream *input) : <superClass>(input) {
 _interpreter = new atn::LexerATNSimulator(this, _atn, _decisionToDFA, _sharedContextCache);
}

<lexer.name>::~<lexer.name>() {
 delete _interpreter;
}

std::string <lexer.name>::getGrammarFileName() const {
 return "<lexer.grammarFileName>";
}

const std::vector\<std::string>& <lexer.name>::getRuleNames() const {
 return _ruleNames;
}

const std::vector\<std::string>& <lexer.name>::getModeNames() const {
 return _modeNames;
}

const std::vector\<std::string>& <lexer.name>::getTokenNames() const {
 return _tokenNames;
}

dfa::Vocabulary& <lexer.name>::getVocabulary() const {
 return _vocabulary;
}

const std::vector\<uint16_t> <lexer.name>::getSerializedATN() const {
 return _serializedATN;
}

const atn::ATN& <lexer.name>::getATN() const {
 return _atn;
}

<namedActions.definitions>

<if (actionFuncs)>
void <lexer.name>::action(RuleContext *context, size_t ruleIndex, size_t actionIndex) {
 switch (ruleIndex) {
   <lexer.actionFuncs.values: {f | case <f.ruleIndex>: <f.name>Action(dynamic_cast\<<f.ctxType> *>(context),
actionIndex); break;}; separator="\n">

 default:
  break;
 }
```

```
}
<endif>

<if (sempredFuncs)>
bool <lexer.name>::sempred(RuleContext *context, size_t ruleIndex, size_t predicateIndex) {
 switch (ruleIndex) {
   <lexer.sempredFuncs.values: {f | case <f.ruleIndex>: return <f.name>Sempred(dynamic_cast\<<f.ctxType>
*>(context), predicateIndex);}; separator="\n">

 default:
   break;
 }
 return true;
}
<endif>

<actionFuncs.values; separator="\n">

<sempredFuncs.values; separator="\n">

// Static vars and initialization.
std::vector\<dfa::DFA> <lexer.name>::_decisionToDFA;
atn::PredictionContextCache <lexer.name>::_sharedContextCache;

// We own the ATN which in turn owns the ATN states.
atn::ATN <lexer.name>::_atn;
std::vector\<uint16_t> <lexer.name>::_serializedATN;

std::vector\<std::string> <lexer.name>::_ruleNames = {
 <lexer.ruleNames: {r | "<r>"}; separator = ", ", wrap, anchor>
};

std::vector\<std::string> <lexer.name>::_modeNames = {
 <lexer.modes: {m | "<m>"}; separator = ", ", wrap, anchor>
};

std::vector\<std::string> <lexer.name>::_literalNames = {
 <lexer.literalNames: {t | <t>}; null = "\"\"", separator = ", ", wrap, anchor>
};

std::vector\<std::string> <lexer.name>::_symbolicNames = {
 <lexer.symbolicNames: {t | <t>}; null = "\"\"", separator = ", ", wrap, anchor>
};

dfa::Vocabulary <lexer.name>::_vocabulary(_literalNames, _symbolicNames);

std::vector\<std::string> <lexer.name>::_tokenNames;
```

```
<lexer.name>::Initializer::Initializer() {
 // This code could be in a static initializer lambda, but VS doesn't allow access to private class members from there.
 for (size_t i = 0; i \< _symbolicNames.size(); ++i) {
  std::string name = _vocabulary.getLiteralName(i);
  if (name.empty()) {
   name = _vocabulary.getSymbolicName(i);
  }

  if (name.empty()) {
   _tokenNames.push_back("\<INVALID>");
  } else {
    _tokenNames.push_back(name);
  }
 }

 <atn>
}

<lexer.name>::Initializer <lexer.name>::_init;
>>

RuleActionFunctionHeader(r, actions) ::= <<
void <r.name>Action(<r.ctxType> *context, size_t actionIndex);
>>

RuleActionFunction(r, actions) ::= <<
void <r.factory.grammar.name>::<r.name>Action(<r.ctxType> *context, size_t actionIndex) {
 switch (actionIndex) {
   <actions: {index | case <index>: <actions.(index)> break;}; separator="\n">

 default:
   break;
 }
}

>>

RuleSempredFunctionHeader(r, actions) ::= <<
bool <r.name>Sempred(<r.ctxType> *_localctx, size_t predicateIndex);
>>

RuleSempredFunction(r, actions) ::= <<
<! Called for both lexer and parser. But only one of them is actually available. Testing for the parser directly
  generates a warning, however. So do the check via the factory instead. !>
bool <if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>::<r.name>Sempred(<r.ctxType> *_localctx,
size_t predicateIndex) {
 switch (predicateIndex) {
   <actions: {index | case <index>: return <actions.(index)>}; separator=";\n">;
```

```
     default:
       break;
     }
     return true;
   }

>>

//-----------------------------------------------------------------------------------------

ParserHeader(parser, funcs, atn, sempredFuncs, superClass = {antlr4::Parser}) ::= <<
<namedActions.context>

class <file.exportMacro> <parser.name> : public <superClass> {
public:
<if (parser.tokens)>
 enum {
   <parser.tokens: {k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
 };
<endif>

<if (parser.tokens)>
 enum {
   <parser.rules: {r | Rule<r.name; format="cap"> = <r.index>}; separator=", ", wrap, anchor>
 };
<endif>

 <parser.name>(antlr4::TokenStream *input);
 ~<parser.name>();

 virtual std::string getGrammarFileName() const override;
 virtual const antlr4::atn::ATN& getATN() const override { return _atn; };
 virtual const std::vector\<std::string>& getTokenNames() const override { return _tokenNames; }; // deprecated:
use vocabulary instead.
 virtual const std::vector\<std::string>& getRuleNames() const override;
 virtual antlr4::dfa::Vocabulary& getVocabulary() const override;

 <namedActions.members>

 <parser.funcs: {f | class <f.name; format = "cap">Context;};  separator = "\n"> <! Forward declare context classes.
!>

 <funcs; separator = "\n">

 <if (sempredFuncs)>
 virtual bool sempred(antlr4::RuleContext *_localctx, size_t ruleIndex, size_t predicateIndex) override;
 <sempredFuncs.values; separator = "\n">
```

```
 <endif>

private:
 static std::vector\<antlr4::dfa::DFA> _decisionToDFA;
 static antlr4::atn::PredictionContextCache _sharedContextCache;
 static std::vector\<std::string> _ruleNames;
 static std::vector\<std::string> _tokenNames;

 static std::vector\<std::string> _literalNames;
 static std::vector\<std::string> _symbolicNames;
 static antlr4::dfa::Vocabulary _vocabulary;
 <atn>

 <namedActions.declarations>

 struct Initializer {
  Initializer();
 };
 static Initializer _init;
};
>>

Parser(parser, funcs, atn, sempredFuncs, superClass = {Parser}) ::= <<
using namespace antlr4;

<parser.name>::<parser.name>(TokenStream *input) : <superClass>(input) {
 _interpreter = new atn::ParserATNSimulator(this, _atn, _decisionToDFA, _sharedContextCache);
}

<parser.name>::~<parser.name>() {
 delete _interpreter;
}

std::string <parser.name>::getGrammarFileName() const {
 return "<parser.grammarFileName>";
}

const std::vector\<std::string>& <parser.name>::getRuleNames() const {
 return _ruleNames;
}

dfa::Vocabulary& <parser.name>::getVocabulary() const {
 return _vocabulary;
}

<namedActions.definitions>

<funcs; separator = "\n\n">
```

```
<if (sempredFuncs)>
bool <parser.name>::sempred(RuleContext *context, size_t ruleIndex, size_t predicateIndex) {
 switch (ruleIndex) {
 <parser.sempredFuncs.values: {f |
 case <f.ruleIndex>: return <f.name>Sempred(dynamic_cast\<<f.ctxType> *>(context), predicateIndex);};
separator="\n">

 default:
   break;
 }
 return true;
}

<sempredFuncs.values; separator="\n"><endif>

// Static vars and initialization.
std::vector\<dfa::DFA> <parser.name>::_decisionToDFA;
atn::PredictionContextCache <parser.name>::_sharedContextCache;

// We own the ATN which in turn owns the ATN states.
atn::ATN <parser.name>::_atn;
std::vector\<uint16_t> <parser.name>::_serializedATN;

std::vector\<std::string> <parser.name>::_ruleNames = {
 <parser.ruleNames: {r | "<r>"}; separator = ", ", wrap, anchor>
};

std::vector\<std::string> <parser.name>::_literalNames = {
 <parser.literalNames: {t | <t>}; null = "\"\"", separator = ", ", wrap, anchor>
};

std::vector\<std::string> <parser.name>::_symbolicNames = {
 <parser.symbolicNames: {t | <t>}; null = "\"\"", separator = ", ", wrap, anchor>
};

dfa::Vocabulary <parser.name>::_vocabulary(_literalNames, _symbolicNames);

std::vector\<std::string> <parser.name>::_tokenNames;

<parser.name>::Initializer::Initializer() {
 for (size_t i = 0; i \< _symbolicNames.size(); ++i) {
  std::string name = _vocabulary.getLiteralName(i);
  if (name.empty()) {
   name = _vocabulary.getSymbolicName(i);
  }

  if (name.empty()) {
```

```
      _tokenNames.push_back("\<INVALID>");
    } else {
      _tokenNames.push_back(name);
    }
  }
}

 <atn>
}

<parser.name>::Initializer <parser.name>::_init;
>>

SerializedATNHeader(model) ::= <<
static antlr4::atn::ATN _atn;
static std::vector\<uint16_t> _serializedATN;
>>

// Constructs the serialized ATN and writes init code for static member vars.
SerializedATN(model) ::= <<
<if (rest(model.segments))>
<model.segments: {segment | static uint16_t serializedATNSegment<i0>[] = {
 <segment; wrap={<\n>   }>
\};}; separator="\n">

<model.segments: {segment | _serializedATN.insert(_serializedATN.end(), serializedATNSegment<i0>,
 serializedATNSegment<i0> + sizeof(serializedATNSegment<i0>) / sizeof(serializedATNSegment<i0>[0]));
}>

<else>
<! only one segment, can be inlined !>
_serializedATN = {
 <model.serialized; wrap = {<\n>}>
};
<endif>

atn::ATNDeserializer deserializer;
_atn = deserializer.deserialize(_serializedATN);

size_t count = _atn.getNumberOfDecisions();
_decisionToDFA.reserve(count);
for (size_t i = 0; i \< count; i++) { <! Rework class ATN to allow standard iterations. !>
 _decisionToDFA.emplace_back(_atn.getDecisionState(i), i);
}
>>

RuleFunctionHeader(currentRule, args, code, locals, ruleCtx, altLabelCtxs, namedActions, finallyAction,
postamble, exceptions) ::= <<
<ruleCtx>
```

```
<! TODO: untested !><if (altLabelCtxs)><altLabelCtxs: {l | <altLabelCtxs.(l)>}; separator="\n"><endif>
<currentRule.ctxType>* <currentRule.name>(<args; separator=",">);

>>

RuleFunction(currentRule, args, code, locals, ruleCtx, altLabelCtxs, namedActions, finallyAction, postamble,
exceptions) ::= <<
<ruleCtx>
<! TODO: untested !><altLabelCtxs: {l | <altLabelCtxs.(l)>}; separator = "\n">
<parser.name>::<currentRule.ctxType>* <parser.name>::<currentRule.name>(<args; separator=","">) {
 <currentRule.ctxType> *_localctx = _tracker.createInstance\<<currentRule.ctxType>\>(_ctx,
getState()<currentRule.args:{a | , <a.name>}>);
 enterRule(_localctx, <currentRule.startState>, <parser.name>::Rule<currentRule.name; format = "cap">);
 <namedActions.init>
 <locals; separator = "\n">

 auto onExit = finally([=] {
 <finallyAction>
  exitRule();
 });
 try {
<! TODO: untested !><if (currentRule.hasLookaheadBlock)>
  size_t alt;
  <endif>
  <code>
<! TODO: untested !>   <postamble; separator = "\n">
  <namedActions.after>
 }
 <if (exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException &e) {
  _errHandler->reportError(this, e);
  _localctx->exception = std::current_exception();
  _errHandler->recover(this, _localctx->exception);
 }
 <endif>

 return _localctx;
}
>>

LeftRecursiveRuleFunctionHeader(currentRule, args, code, locals, ruleCtx, altLabelCtxs, namedActions,
finallyAction, postamble) ::= <<
<ruleCtx>
<! TODO: untested !><altLabelCtxs: {l | <altLabelCtxs.(l)>}; separator="\n">
<currentRule.ctxType>* <currentRule.name>(<currentRule.args; separator = ", ">);
<currentRule.ctxType>* <currentRule.name>(int precedence<currentRule.args: {a | , <a>}>);
```

```
>>

LeftRecursiveRuleFunction(currentRule, args, code, locals, ruleCtx, altLabelCtxs, namedActions, finallyAction,
postamble) ::= <<
<ruleCtx>
<altLabelCtxs: {l | <altLabelCtxs.(l)>}; separator="\n">

<parser.name>::<currentRule.ctxType>* <parser.name>::<currentRule.name>(<currentRule.args; separator=", ">) {
<! TODO: currentRule.args untested !>   return <currentRule.name>(0<currentRule.args: {a | , <a.name>}>);
}

<parser.name>::<currentRule.ctxType>* <parser.name>::<currentRule.name>(int precedence<currentRule.args:{a |
, <a>}>) {
 ParserRuleContext *parentContext = _ctx;
 size_t parentState = getState();
 <parser.name>::<currentRule.ctxType> *_localctx = _tracker.createInstance\<<currentRule.ctxType>\>(_ctx,
parentState<currentRule.args: {a | , <a.name>}>);
 <parser.name>::<currentRule.ctxType> *previousContext = _localctx;
 size_t startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>::Rule<currentRule.name; format = "cap">,
precedence);

   <namedActions.init>
<! TODO: untested !>    <locals; separator = "\n">

 auto onExit = finally([=] {
<if (finallyAction)><finallyAction><endif>
  unrollRecursionContexts(parentContext);
 });
 try {
  <if (currentRule.hasLookaheadBlock)>size_t alt;<endif>
  <code>
<! TODO: untested !><postamble; separator = "\n">
  <namedActions.after>
 }
 catch (RecognitionException &e) {
  _errHandler->reportError(this, e);
  _localctx->exception = std::current_exception();
  _errHandler->recover(this, _localctx->exception);
 }
 return _localctx;
}
>>

StructDeclHeader(struct, ctorAttrs, attrs, getters, dispatchMethods, interfaces, extensionMembers) ::= <<
class <file.exportMacro> <struct.name> : public <if
(contextSuperClass)><contextSuperClass><else>antlr4::ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
```

```
public:
 <attrs: {a | <a>;}; separator="\n">
 <if (ctorAttrs)><struct.name>(antlr4::ParserRuleContext *parent, size_t invokingState);<endif>
 <struct.name>(antlr4::ParserRuleContext *parent, size_t invokingState<ctorAttrs: {a | , <a>}>);
<if (struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 <struct.name>() : antlr4::ParserRuleContext() { }
 void copyFrom(<struct.name> *context);
 using antlr4::ParserRuleContext::copyFrom;
<endif>

 virtual size_t getRuleIndex() const override;
 <getters: {g | <g>}; separator = "\n">

 <dispatchMethods; separator = "\n">
<! TODO: untested !> <extensionMembers; separator = "\n">
};

>>

StructDecl(struct, ctorAttrs, attrs, getters, dispatchMethods, interfaces, extensionMembers) ::= <<
//----------------- <struct.name> ---------------------------------------------------------------

<if (ctorAttrs)>
<parser.name>::<struct.name>::<struct.name>(ParserRuleContext *parent, size_t invokingState)
 : <if (contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>(parent, invokingState) {
}
<endif>

<parser.name>::<struct.name>::<struct.name>(ParserRuleContext *parent, size_t invokingState<ctorAttrs: {a | ,
<a>}>)
 : <if (contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>(parent, invokingState) {
 <struct.ctorAttrs: {a | this-><a.name> = <a.name>;}; separator="\n">
}

<getters: {g | <g>}; separator = "\n">

size_t <parser.name>::<struct.name>::getRuleIndex() const {
 return <parser.name>::Rule<struct.derivedFromName; format = "cap">;
}

<if (struct.provideCopyFrom)>
void <parser.name>::<struct.name>::copyFrom(<struct.name> *ctx) {
 <if (contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>::copyFrom(ctx);
 <struct.attrs: {a | this-><a.name> = ctx-><a.name>;}; separator = "\n">
}
<endif>
<dispatchMethods; separator = "\n\n">
<! TODO: untested !><extensionMembers; separator = "\n\n">
```

```
>>

AltLabelStructDeclHeader(struct, attrs, getters, dispatchMethods) ::= <<
class <file.exportMacro> <struct.name> : public <currentRule.name; format = "cap">Context {
public:
 <struct.name>(<currentRule.name; format = "cap">Context *ctx);

 <if (attrs)><attrs: {a | <a>}; separator = "\n"><endif>
 <getters: {g | <g>}; separator = "\n">
 <dispatchMethods; separator = "\n">
};

>>

AltLabelStructDecl(struct, attrs, getters, dispatchMethods) ::= <<
//----------------- <struct.name> -----------------------------------------------------------------

<! TODO: untested !><if (attrs)><attrs: {a | <a>}; separator = "\n"><endif>
<getters: {g | <g>}; separator = "\n">
<parser.name>::<struct.name>::<struct.name>(<currentRule.name; format = "cap">Context *ctx) { copyFrom(ctx);
}

<dispatchMethods; separator="\n">
>>


CodeBlockForOuterMostAltHeader(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= "<! Required to exist, but unused. !>"
CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if (currentOuterMostAltCodeBlock.altLabel)>
_localctx = dynamic_cast\<<currentRule.ctxType>
*>(_tracker.createInstance\<<parser.name>::<currentOuterMostAltCodeBlock.altLabel; format =
"cap">Context>(_localctx));
<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock = currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAltHeader(currentAltCodeBlock, locals, preamble, ops) ::= "<! Required to exist, but unused. !>"
CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<! TODO: untested !><locals; separator = "\n">
<! TODO: untested !><preamble; separator = "\n">
<ops; separator = "\n">
>>

LL1AltBlockHeader(choice, preamble, alts, error) ::= "<! Required to exist, but unused. !>"
LL1AltBlock(choice, preamble, alts, error) ::= <<
```

```
setState(<choice.stateNumber>);
_errHandler->sync(this);
<! TODO: untested !><if (choice.label)>LL1AltBlock(choice, preamble, alts, error) <labelref(choice.label)> =
_input->LT(1);<endif>
<preamble; separator="\n">
switch (_input->LA(1)) {
 <choice.altLook, alts: {look, alt | <cases(ttypes = look)> {
 <alt>
 break;
\}
}; separator = "\n">
default:
 <error>
}
>>


LL1OptionalBlockHeader(choice, alts, error) ::= "<! Required but unused. !>"
LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);
switch (_input->LA(1)) {
 <choice.altLook, alts: {look, alt | <cases(ttypes = look)> {
 <alt>
 break;
\}
}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAltHeader(choice, expr, alts, preamble, error, followExpr) ::= "<! Required but unused. !>"
LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);

<preamble; separator = "\n">
if (<expr>) {
 <alts; separator = "\n">
}
>>


LL1StarBlockSingleAltHeader(choice, loopExpr, alts, preamble, iteration) ::= "<! Required but unused. !>"
LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
```

```
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>);
 _errHandler->sync(this);
 <iteration>
 }
 >>


LL1PlusBlockSingleAltHeader(choice, loopExpr, alts, preamble, iteration) ::= "<! Required but unused. !>"
LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler->sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 _errHandler->sync(this);
 <iteration>
 } while (<loopExpr>);
 >>


// LL(*) stuff

AltBlockHeader(choice, preamble, alts, error) ::= "<! Unused but must be present. !>"
AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);
<! TODO: untested !><if (choice.label)><labelref(choice.label)> = _input->LT(1);<endif>
<! TODO: untested !><preamble; separator = "\n">
switch (getInterpreter\<atn::ParserATNSimulator>()->adaptivePredict(_input, <choice.decision>, _ctx)) {
<alts: {alt | case <i>: {
 <alt>
 break;
\}
}; separator="\n">
}
>>


OptionalBlockHeader(choice, alts, error) ::= "<! Unused but must be present. !>"
OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);

switch (getInterpreter\<atn::ParserATNSimulator>()->adaptivePredict(_input, <choice.decision>, _ctx)) {
<alts: {alt | case <i><if (!choice.ast.greedy)> + 1<endif>: {
 <alt>
 break;
\}
}; separator = "\n">
```

```
}
>>

StarBlockHeader(choice, alts, sync, iteration) ::= "<! Unused but must be present. !>"
StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler->sync(this);
alt = getInterpreter\<atn::ParserATNSimulator>()->adaptivePredict(_input, <choice.decision>, _ctx);
while (alt != <choice.exitAlt> && alt != atn::ATN::INVALID_ALT_NUMBER) {
 if (alt == 1<if(!choice.ast.greedy)> + 1<endif>) {
   <iteration>
   <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler->sync(this);
 alt = getInterpreter\<atn::ParserATNSimulator>()->adaptivePredict(_input, <choice.decision>, _ctx);
}
>>

PlusBlockHeader(choice, alts, error) ::= "<! Required to exist, but unused. !>"
PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler->sync(this);
alt = 1<if(!choice.ast.greedy)> + 1<endif>;
do {
 switch (alt) {
   <alts: {alt | case <i><if (!choice.ast.greedy)> + 1<endif>: {
     <alt>
     break;
   \}
 }; separator="\n">
 default:
   <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler->sync(this);
 alt = getInterpreter\<atn::ParserATNSimulator>()->adaptivePredict(_input, <choice.decision>, _ctx);
} while (alt != <choice.exitAlt> && alt != atn::ATN::INVALID_ALT_NUMBER);
>>

Sync(s) ::= "Sync(s) sync(<s.expecting.name>);"

ThrowNoViableAltHeader(t) ::= "<! Unused but must be present. !>"
ThrowNoViableAlt(t) ::= "throw NoViableAltException(this);"

TestSetInlineHeader(s) ::= "<! Required but unused. !>"
TestSetInline(s) ::= <<
<s.bitsets: {bits | <if (rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
```

```
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount> & ~ 0x3fULL) == 0)
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> &&
 ((1ULL \<\< <offsetShift(s.varName, bits.shift)>) & (<bits.ttypes: {ttype | (1ULL \<\< <offsetShift(ttype, bits.shift,
true)>)}; separator = "\n  | ">)) != 0)
>>


isZero ::= [
 "0": true,
 default: false
]

offsetShift(shiftAmount, offset, prefix = false) ::= <%
<if (!isZero.(offset))>(<if (prefix)><parser.name>::<endif><shiftAmount> - <offset>)<else><if
(prefix)><parser.name>::<endif><shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes: {ttype | <s.varName> == <parser.name>::<ttype>}; separator = "\n\n|| ">
%>


cases(ttypes) ::= <<
<ttypes: {t | case <parser.name>::<t>:}; separator="\n">
>>


InvokeRuleHeader(r, argExprsChunks) ::= "InvokeRuleHeader"
InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels: {l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>


MatchTokenHeader(m) ::= "<! Required but unused. !>"
MatchToken(m) ::= <<
setState(<m.stateNumber>);
<if (m.labels)><m.labels: {l | <labelref(l)> = }><endif>match(<parser.name>::<m.name>);
>>
```

MatchSetHeader(m, expr, capture) ::= "<! Required but unused. !>"
MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSetHeader(m, expr, capture) ::= "<! Required but unused. !>"
MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if (m.labels)><m.labels: {l | <labelref(l)> = }>_input->LT(1);<endif>
<capture>
if (<if (invert)><m.varName> == 0 || <m.varName> == Token::EOF || <else>!<endif>(<expr>)) {
 <if (m.labels)><m.labels: {l | <labelref(l)> = }><endif>_errHandler->recoverInline(this);
}
else {
 _errHandler->reportMatch(this);
 consume();
}
>>

WildcardHeader(w) ::= "<! Required but unused. !>"
Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if (w.labels)><w.labels: {l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

ActionHeader(a, foo, chunks) ::= "<chunks>"
Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "ArgAction(a, chunks) <chunks>"

SemPredHeader(p, chunks, failChunks) ::= "<! Required but unused. !>"
SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>);

if (!(<chunks>)) throw FailedPredicateException(this, <p.predicate><if (failChunks)>, <failChunks><elseif
(p.msg)>, <p.msg><endif>);
>>

ExceptionClauseHeader(e, catchArg, catchAction) ::= "<! Required but unused. !>"
ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// Lexer actions are not associated with model objects.

LexerSkipCommand() ::= "skip();"
LexerMoreCommand() ::= "more();"
LexerPopModeCommand() ::= "popMode();"

LexerTypeCommand(arg, grammar)   ::= "type = <grammar.name>::<arg>;"
LexerChannelCommand(arg, grammar)   ::= "channel = <arg>;"
LexerModeCommand(arg, grammar)   ::= "mode = <grammar.name>Mode::<arg>;"
LexerPushModeCommand(arg, grammar) ::= "pushMode(<grammar.name>Mode::<arg>);"

ActionTextHeader(t) ::= "<t.text>"
ActionText(t) ::= "<t.text>"

ActionTemplateHeader(t) ::= "<! Required but unused. !>"
ActionTemplate(t) ::= "<t.st>"

ArgRefHeader(t) ::= "<! Required but unused. !>"
ArgRef(a) ::= "_localctx-><a.name>"

LocalRefHeader(t) ::= "<! Required but unused. !>"
LocalRef(a) ::= "_localctx-><a.name>"

RetValueRefHeader(t) ::= "<! Required but unused. !>"
RetValueRef(a) ::= "_localctx-><a.name>"

QRetValueRefHeader(t) ::= "<! Required but unused. !>"
QRetValueRef(a) ::= "<ctx(a)>-><a.dict>-><a.name>"
/** How to translate $tokenLabel */

TokenRefHeader(t) ::= "<! Required but unused. !>"
TokenRef(t) ::= "<ctx(t)>-><t.name>"

LabelRefHeader(t) ::= "<! Required but unused. !>"
LabelRef(t) ::= "<ctx(t)>-><t.name>"

ListLabelRefHeader(t) ::= "<! Required but unused. !>"
ListLabelRef(t) ::= "<ctx(t)>-><ListLabelName(t.name)>"

SetAttrHeader(t) ::= "<! Required but unused. !>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>-><s.name> = <rhsChunks>;"

InputSymbolType() ::= "<file.InputSymbolType; null = {Token}> *"

TokenPropertyRef_textHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_text(t) ::= <<(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getText() : "")>>

TokenPropertyRef_typeHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_type(t) ::= "(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getType() : 0)"

TokenPropertyRef_lineHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_line(t) ::= "(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getLine() : 0)"

TokenPropertyRef_posHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getCharPositionInLine() : 0)"

TokenPropertyRef_channelHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getChannel() : 0)"

TokenPropertyRef_indexHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_index(t) ::= "(<ctx(t)>-><t.label> != nullptr ? <ctx(t)>-><t.label>->getTokenIndex() : 0)"

TokenPropertyRef_intHeader(t) ::= "<! Required but unused. !>"
TokenPropertyRef_int(t) ::= "(<ctx(t)>-><t.label> != nullptr ? std::stoi(<ctx(t)>-><t.label>->getText()) : 0)"

RulePropertyRef_startHeader(r) ::= "<! Required but unused. !>"
RulePropertyRef_start(r) ::= "(<ctx(r)>-><r.label> != nullptr ? (<ctx(r)>-><r.label>->start) : nullptr)"

RulePropertyRef_stopHeader(r) ::= "<! Required but unused. !>"
RulePropertyRef_stop(r) ::= "(<ctx(r)>-><r.label> != nullptr ? (<ctx(r)>-><r.label>->stop) : nullptr)"

RulePropertyRef_textHeader(r) ::= "<! Required but unused. !>"
RulePropertyRef_text(r) ::= "(<ctx(r)>-><r.label> != nullptr ? _input->getText(<ctx(r)>-><r.label>->start,
<ctx(r)>-><r.label>->stop) : nullptr)"

RulePropertyRef_ctxHeader(r)   ::= "<! Required but unused. !>"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>-><r.label>"

ThisRulePropertyRef_start(r) ::= "ThisRulePropertyRef_start(r) _localctx->start"
ThisRulePropertyRef_stop(r) ::= "ThisRulePropertyRef_stop(r) _localctx->stop"

ThisRulePropertyRef_textHeader(r) ::= "<! Required but unused. !>"
ThisRulePropertyRef_text(r) ::= "_input->getText(_localctx->start, _input->LT(-1))"

ThisRulePropertyRef_ctxHeader(r)   ::= "<! Required but unused. !>"
ThisRulePropertyRef_ctx(r)   ::= "_localctx"

ThisRulePropertyRef_parserHeader(r) ::= "<! Required but unused. !>"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s) ::= "NonLocalAttrRef(s) ((<s.ruleName;
format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::=
 "SetNonLocalAttr(s, rhsChunks) ((<s.ruleName;
format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"

AddToLabelListHeader(a) ::= "<! Required but unused. !>"

```
AddToLabelList(a) ::= <<
<ctx(a.label)>-><a.listName>.push_back(<labelref(a.label)>);
>>


TokenLabelType() ::= "<file.TokenLabelType; null = {Token}> *"

TokenDeclHeader(t) ::= "antlr4::<TokenLabelType()><t.name> = nullptr;"
TokenDecl(t) ::= "<! Variable Declaration !>"

TokenTypeDeclHeader(t) ::= "<! Local Variable !>"
TokenTypeDecl(t) ::= "size_t <t.name> = 0;"

TokenListDeclHeader(t) ::= "std::vector\<antlr4::Token *> <t.name>;"
TokenListDecl(t) ::= "<! Variable Declaration !>"

RuleContextDeclHeader(r) ::= "<parser.name>::<r.ctxName> *<r.name> = nullptr;"
RuleContextDecl(r) ::= "<! Variable Declaration !>"

RuleContextListDeclHeader(rdecl) ::= "std::vector\<<rdecl.ctxName> *> <rdecl.name>;"
RuleContextListDecl(rdecl) ::= "<! Variable Declaration !>"

ContextTokenGetterDeclHeader(t) ::= "antlr4::tree::TerminalNode *<t.name>();"
ContextTokenGetterDecl(t) ::= <<
tree::TerminalNode* <parser.name>::<t.ctx.name>::<t.name>() {
 return getToken(<parser.name>::<t.name>, 0);
}

>>

ContextTokenListGetterDeclHeader(t) ::= "std::vector\<antlr4::tree::TerminalNode *> <t.name>();"
ContextTokenListGetterDecl(t) ::= <<
std::vector\<tree::TerminalNode *> <parser.name>::<t.ctx.name>::<t.name>() {
 return getTokens(<parser.name>::<t.name>);
}

>>

ContextTokenListIndexedGetterDeclHeader(t) ::= "antlr4::tree::TerminalNode* <t.name>(size_t i);"
ContextTokenListIndexedGetterDecl(t)  ::= <<
tree::TerminalNode* <parser.name>::<t.ctx.name>::<t.name>(size_t i) {
 return getToken(<parser.name>::<t.name>, i);
}

>>

ContextRuleGetterDeclHeader(r) ::= "<r.ctxName> *<r.name>();"
ContextRuleGetterDecl(r) ::= <<
<! Note: ctxName is the name of the context to return, while ctx is the owning context. !>
```

```
<parser.name>::<r.ctxName>* <parser.name>::<r.ctx.name>::<r.name>() {
 return getRuleContext\<<parser.name>::<r.ctxName>\>(0);
}

>>

ContextRuleListGetterDeclHeader(r) ::= "std::vector\<<r.ctxName> *> <r.name>();"
ContextRuleListGetterDecl(r) ::= <<
std::vector\<<parser.name>::<r.ctxName> *> <parser.name>::<r.ctx.name>::<r.name>() {
 return getRuleContexts\<<parser.name>::<r.ctxName>\>();
}

>>

ContextRuleListIndexedGetterDeclHeader(r) ::= "<r.ctxName>* <r.name>(size_t i);"
ContextRuleListIndexedGetterDecl(r) ::= <<
<parser.name>::<r.ctxName>* <parser.name>::<r.ctx.name>::<r.name>(size_t i) {
 return getRuleContext\<<parser.name>::<r.ctxName>\>(i);
}

>>

LexerRuleContext() ::= "antlr4::RuleContext"

// The rule context name is the rule followed by a suffix; e.g. r becomes rContext.
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= <<
<tokenName; format = "lower">Token
>>

ImplicitRuleLabel(ruleName) ::= "<ruleName>Context"
ImplicitSetLabel(id) ::= "_tset<id>"
ListLabelName(label) ::= "<label>"

CaptureNextToken(d) ::= "CaptureNextToken(d) <d.varName> = _input->LT(1);"

CaptureNextTokenTypeHeader(d) ::= "<! Required but unused. !>"
CaptureNextTokenType(d) ::= "<d.varName> = _input->LA(1);"

ListenerDispatchMethodHeader(method) ::= <<
virtual void <if (method.isEnter)>enter<else>exit<endif>Rule(antlr4::tree::ParseTreeListener *listener) override;
>>
ListenerDispatchMethod(method) ::= <<
void <parser.name>::<struct.name>::<if (method.isEnter)>enter<else>exit<endif>Rule(tree::ParseTreeListener
*listener) {
 auto parserListener = dynamic_cast\<<parser.grammarName>Listener *>(listener);
 if (parserListener != nullptr)
```

```
  parserListener-><if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
}
>>


VisitorDispatchMethodHeader(method) ::= <<

virtual antlrcpp::Any accept(antlr4::tree::ParseTreeVisitor *visitor) override;
>>
VisitorDispatchMethod(method) ::=  <<

antlrcpp::Any <parser.name>::<struct.name>::accept(tree::ParseTreeVisitor *visitor) {
 if (auto parserVisitor = dynamic_cast\<<parser.grammarName>Visitor*>(visitor))
   return parserVisitor->visit<struct.derivedFromName; format="cap">(this);
 else
   return visitor->visitChildren(this);
}
>>


AttributeDeclHeader(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"
AttributeDecl(d) ::= "<d.type> <d.name>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if (!x.isLocal)>dynamic_cast\<<x.ctx.name> *>(_localctx)-><endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "dynamic_cast\<<actionChunk.ctx.name> *>(_localctx)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec) ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name) ::= "recRuleSetReturnAction(src,name) $<name>=$<src>.<name>;"
recRuleSetStopToken() ::= "_ctx->stop = _input->LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
_localctx = _tracker.createInstance\<<ctxName>Context>(parentContext, parentState);
<if (label)>_localctx-><label> = previousContext;<endif>
pushNewRecursionContext(_localctx, startState, Rule<ruleName; format = "cap">);
>>

// Separate context variable to avoid frequent pointer type casts.
recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
auto newContext = _tracker.createInstance\<<currentAltLabel; format =
"cap">Context>(_tracker.createInstance\<<ruleName; format="cap">Context>(parentContext, parentState));
_localctx = newContext;
<if(label)>
<if(isListLabel)>
newContext-><label>.push_back(previousContext);
<else>
newContext-><label> = previousContext;
```

```
<endif>
<endif>
pushNewRecursionContext(newContext, startState, Rule<ruleName; format = "cap">);
>>


recRuleReplaceContext(ctxName) ::= <<
_localctx = _tracker.createInstance\<<ctxName>Context>(_localctx);
_ctx = _localctx;
previousContext = _localctx;
>>


recRuleSetPrevCtx() ::= <<
if (!_parseListeners.empty())
 triggerExitRuleEvent();
previousContext = _localctx;
>>


/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<cppTypeInitMap.(typeName)>
>>
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/Cpp/Cpp.stg
No license file was found, but licenses were detected in source scan.

```
/** ANTLR tool checks output templates are compatible with tool code generation.
 * For now, a simple string match used on x.y of x.y.z scheme.
 * Must match Tool.VERSION during load to templates.
 *
 * REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from antlr4 import *
from io import StringIO

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>
```

```
# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

    <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass


# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass


}; separator="\n">


>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    return self.visitChildren(ctx)

}; separator="\n">

del <file.parserName>
>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
```

```
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>

    <parser:(ctor)()>

    <namedActions.members>

    <funcs; separator="\n">


<if(sempredFuncs)>
    def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
        if self._predicates == None:
            self._predicates = dict()
<parser.sempredFuncs.values:{f |
        self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
        pred = self._predicates.get(ruleIndex, None)
        if pred is None:
            raise Exception("No predicate with index:" + str(ruleIndex))
```

```
    else:
        return pred(localctx, predIndex)


    <sempredFuncs.values; separator="\n">
<endif>




>>


dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx:RuleContext, ruleIndex:int, actionIndex:int):
 if self._actions is None:
  actions = dict()
<recog.actionFuncs.values:{f|
 actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
  self._actions = actions
 action = self._actions.get(ruleIndex, None)
 if action is not None:
  action(localctx, actionIndex)
 else:
  raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
  if self._predicates is None:
      preds = dict()
<recog.sempredFuncs.values:{f|
      preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
      self._predicates = preds
  pred = self._predicates.get(ruleIndex, None)
  if pred is not None:
      return pred(localctx, predIndex)
  else:
      raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
def __init__(self, input:TokenStream):
  super().__init__(input)
  self.checkVersion("<file.ANTLRVersion>")
```

```
    self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
    self._predicates = None
```

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

```
def <r.name>_action(self, localctx:<r.ctxType> , actionIndex:int):
<actions:{index|
<if(first(actions))>
  if actionIndex == <index>:
      <actions.(index)>
<elseif(rest(actions))>
  elif actionIndex == <index>:
      <actions.(index)>
<endif> }; separator="\n">
```
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
```
def <r.name>_sempred(self, localctx:<r.ctxType>, predIndex:int):
  <actions:{index|
<if(first(actions))>
  if predIndex == <index>:
      return <actions.(index)>
<elseif(rest(actions))>
  elif predIndex == <index>:
      return <actions.(index)>
<endif> }; separator="\n">
```

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

```
def <currentRule.name>(self<currentRule.args:{a | , <a.name><if(a.type)>:<a.type><endif>}>):

  localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
  self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
```

```
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    <endif>
    finally:
        <finallyAction>
        self.exitRule()
    return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p:int=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    finally:
        <finallyAction>
        self.unrollRecursionContexts(_parentctx)
```

```
    return localctx

>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>


>>


LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">
```

```
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  <iteration>

>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
  <alts; separator="\n">
  self.state = <choice.stateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  <iteration>
  if not (<loopExpr>):
    break

>>


// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
  <alt>
  pass
}; separator="\nel">

>>


OptionalBlock(choice, alts, error) ::= <<
```

```
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">


>>


StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  if _alt==1<if(!choice.ast.greedy)>+1<endif>:
    <iteration>
    <alts> <! should only be one !>
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)


>>


PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
    <error>
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)


>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" or ">
```

```
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>

cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>

InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>

MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"
```

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l | <labelref(l)> = }><else>   <endif>self._errHandler.recoverInline(self)
else:
    self._errHandler.reportMatch(self)
    self.consume()
>>

Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
    from antlr4.error.Errors import FailedPredicateException
    raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand() ::= "skip()"
LexerMoreCommand() ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)   ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)   ::= "_mode = <arg>"

LexerPushModeCommand(arg, grammar) ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type())"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r) ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

```
ContextTokenGetterDecl(t)     ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>


// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>


ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i:int=None):
  if i is None:
    return self.getTokens(<parser.name>.<t.name>)
  else:
    return self.getToken(<parser.name>.<t.name>, i)
>>


ContextRuleGetterDecl(r)       ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)


>>


// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)


>>


ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i:int=None):
  if i is None:
    return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
  else:
    return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)


>>


LexerRuleContext() ::= "RuleContext"


/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"
```

```
ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"


CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent:ParserRuleContext=None, invokingState:int=-1<struct.ctorAttrs:{a | ,
<a.name><if(a.type)>:<a.type><endif>=None}>):
    super().__init__(parent, invokingState)
    self.parser = parser
    <attrs:{a | <a>}; separator="\n">
    <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

  <getters:{g | <g>}; separator="\n\n">

  def getRuleIndex(self):
    return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx:ParserRuleContext):
    super().copyFrom(ctx)
    <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
  <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

  def __init__(self, parser, ctx:ParserRuleContext): # actually a <parser.name>.<currentRule.name;
format="cap">Context
    super().__init__(parser)
    <attrs:{a | <a>}; separator="\n">
    self.copyFrom(ctx)

  <getters:{g | <g>}; separator="\n">

  <dispatchMethods; separator="\n">
```

```
>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener:ParseTreeListener):
  if hasattr( listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">" ):
    listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor:ParseTreeVisitor):
  if hasattr( visitor, "visit<struct.derivedFromName; format="cap">" ):
    return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
    return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
```

```
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
    self.triggerExitRuleEvent()
_prevctx = localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
from antlr4 import *
from io import StringIO

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

    <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

    modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ]

    literalNames = [ "\<INVALID>",
            <lexer.literalNames:{t | <t>}; separator=", ", wrap, anchor> ]

    symbolicNames = [ "\<INVALID>",
            <lexer.symbolicNames:{t | <t>}; separator=", ", wrap, anchor> ]

    ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]
```

```
    grammarFileName = "<lexer.grammarFileName>"

  def __init__(self, input=None):
    super().__init__(input)
    self.checkVersion("<lexerFile.ANTLRVersion>")
    self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
    self._actions = None
    self._predicates = None

  <namedActions.members>

  <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
  with StringIO() as buf:
    buf.write("<model.serialized; wrap={")<\n>        buf.write("}>")
    return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/Python3/Python3.stg
No license file was found, but licenses were detected in source scan.

```
/*
 * Copyright (c) 2012-2016 The ANTLR Project. All rights reserved.
 * Use of this file is governed by the BSD 3-clause license that
 * can be found in the LICENSE.txt file in the project root.
 */
/**
 [The "BSD license"]
 Copyright (c) 2011 Cay Horstmann
```

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*/

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/gui/GraphicsSupport.java
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]
* Copyright (c) 2012-2016 Terence Parr
* Copyright (c) 2012-2016 Sam Harwell
* Copyright (c) 2014 Eric Vergnaud
* All rights reserved.
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
*
* 1. Redistributions of source code must retain the above copyright
*   notice, this list of conditions and the following disclaimer.
* 2. Redistributions in binary form must reproduce the above copyright
*   notice, this list of conditions and the following disclaimer in the
*   documentation and/or other materials provided with the distribution.
* 3. The name of the author may not be used to endorse or promote products

```
/** ANTLR tool checks output templates are compatible with tool code generation.
 * For now, a simple string match used on x.y of x.y.z scheme.
 * Must match Tool.VERSION during load to templates.
 *
 * REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>
```

```
# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

  <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx):
  pass


# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx):
  pass


}; separator="\n">


>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>


# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.


class <file.grammarName>Visitor(ParseTreeVisitor):

  <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx):
  return self.visitChildren(ctx)


}; separator="\n">


>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>
```

```
<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

  grammarFileName = "<parser.grammarFileName>"

  atn = ATNDeserializer().deserialize(serializedATN())

  decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

  sharedContextCache = PredictionContextCache()

  literalNames = [ <parser.literalNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  symbolicNames = [ <parser.symbolicNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

  ruleNames =  [ <parser.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

  EOF = <TokenLabelType()>.EOF
<if(parser.tokens)>
<parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
<endif>

  <parser:(ctor)()>

  <namedActions.members>

  <funcs; separator="\n">


<if(sempredFuncs)>
  def sempred(self, localctx, ruleIndex, predIndex):
    if self._predicates == None:
      self._predicates = dict()
<parser.sempredFuncs.values:{f |
    self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
    pred = self._predicates.get(ruleIndex, None)
    if pred is None:
      raise Exception("No predicate with index:" + str(ruleIndex))
    else:
      return pred(localctx, predIndex)

  <sempredFuncs.values; separator="\n">
<endif>
```

```
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx, ruleIndex, actionIndex):
 if self._actions is None:
  actions = dict()
<recog.actionFuncs.values:{f|
  actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
  self._actions = actions
 action = self._actions.get(ruleIndex, None)
 if action is not None:
  action(localctx, actionIndex)
 else:
  raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx, ruleIndex, predIndex):
   if self._predicates is None:
      preds = dict()
<recog.sempredFuncs.values:{f|
      preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
      self._predicates = preds
   pred = self._predicates.get(ruleIndex, None)
   if pred is not None:
      return pred(localctx, predIndex)
   else:
      raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input):
   super(<parser.name>, self).__init__(input)
   self.checkVersion("<file.ANTLRVersion>")
   self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
   self._predicates = None

>>

/* This generates a private method since the actionIndex is generated, making an
```

```
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx , actionIndex):
<actions:{index|
<if(first(actions))>
   if actionIndex == <index>:
      <actions.(index)>
<elseif(rest(actions))>
   elif actionIndex == <index>:
      <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx, predIndex):
   <actions:{index|
<if(first(actions))>
   if predIndex == <index>:
      return <actions.(index)>
<elseif(rest(actions))>
   elif predIndex == <index>:
      return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name>}>):

   localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
   self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
   <namedActions.init>
   <locals; separator="\n">
   try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
```

```
<if(exceptions)>
<exceptions; separator="\n">
<else>
except RecognitionException as re:
    localctx.exception = re
    self._errHandler.reportError(self, re)
    self._errHandler.recover(self, re)
<endif>
finally:
    <finallyAction>
    self.exitRule()
return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    finally:
        <finallyAction>
        self.unrollRecursionContexts(_parentctx)
    return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
```

```
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>


LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
```

```
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
  <alts; separator="\n">
  self.state = <choice.stateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  <iteration>
  if not (<loopExpr>):
    break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
  <alt>
  pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
```

```
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  if _alt==1<if(!choice.ast.greedy)>+1<endif>:
    <iteration>
    <alts> <! should only be one !>
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
    <error>
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" or ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>
```

```
// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>


cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>


InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>


MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
```

```
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |    <labelref(l)> = }><else>   <endif>self._errHandler.recoverInline(self)
else:
  self._errHandler.reportMatch(self)
  self.consume()
>>


Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>


// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
  from antlr4.error.Errors import FailedPredicateException
  raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>


// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"


LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
```

RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type()"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r) ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s) ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t) ::= <<
def <t.name>(self):
    return self.getToken(<parser.name>.<t.name>, 0)
>>

```
// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
    return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i=None):
    if i is None:
        return self.getTokens(<parser.name>.<t.name>)
    else:
        return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)      ::= <<
def <r.name>(self):
    return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
    return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i=None):
    if i is None:
        return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
    else:
        return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)     ::= "<label>"
```

```
CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent=None, invokingState=-1<struct.ctorAttrs:{a | , <a.name>=None}>):
    super(<parser.name>.<struct.name>, self).__init__(parent, invokingState)
    self.parser = parser
    <attrs:{a | <a>}; separator="\n">
    <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">


  <getters:{g | <g>}; separator="\n\n">


  def getRuleIndex(self):
    return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx):
    super(<parser.name>.<struct.name>, self).copyFrom(ctx)
    <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
  <extensionMembers; separator="\n">

>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

  def __init__(self, parser, ctx): # actually a <parser.name>.<currentRule.name; format="cap">Context)
    super(<parser.name>.<struct.name>, self).__init__(parser)
    <attrs:{a | <a>}; separator="\n">
    self.copyFrom(ctx)

  <getters:{g | <g>}; separator="\n">

  <dispatchMethods; separator="\n">

>>


ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener):
  if hasattr(listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">"):
    listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>
```

```
VisitorDispatchMethod(method) ::= <<
def accept(self, visitor):
  if hasattr(visitor, "visit<struct.derivedFromName; format="cap">"):
    return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
    return visitor.visitChildren(self)

>>


AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"


/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"


/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"


// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "self._ctx.stop = self._input.LT(-1)"


recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>


recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>



recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>
```

```
recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
  self.triggerExitRuleEvent()
_prevctx = localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

  atn = ATNDeserializer().deserialize(serializedATN())

  decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

  <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

  <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

  modeNames = [ <lexer.modes:{m| u"<m>"}; separator=", ", wrap, anchor> ]

  literalNames = [ u"\<INVALID>",
       <lexer.literalNames:{t | u<t>}; separator=", ", wrap, anchor> ]

  symbolicNames = [ u"\<INVALID>",
       <lexer.symbolicNames:{t | u<t>}; separator=", ", wrap, anchor> ]

  ruleNames = [ <lexer.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

  grammarFileName = u"<lexer.grammarFileName>"

  def __init__(self, input=None):
     super(<lexer.name>, self).__init__(input)
```

```
    self.checkVersion("<lexerFile.ANTLRVersion>")
    self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
    self._actions = None
    self._predicates = None


  <namedActions.members>

  <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write(u"<model.serialized; wrap={")<\n>      buf.write(u"}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/codegen/Python2/Python2.stg
No license file was found, but licenses were detected in source scan.

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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

location(file, line, column) ::= "<file>:<line>:"

message(id, text) ::= "<text> (<id>)"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/messages/formats/gnu.stg
No license file was found, but licenses were detected in source scan.

/*
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```
/** The definitive ANTLR v3 tree grammar to walk/visit ANTLR v4 grammars.
 *  Parses trees created by ANTLRParser.g.
 *
 *  Rather than have multiple tree grammars, one for each visit, I'm
 *  creating this generic visitor that knows about context. All of the
 *  boilerplate pattern recognition is done here. Then, subclasses can
 *  override the methods they care about. This prevents a lot of the same
 *  context tracking stuff like "set current alternative for current
 *  rule node" that is repeated in lots of tree filters.
 */
tree grammar GrammarTreeVisitor;
options {
 language     = Java;
 tokenVocab    = ANTLRParser;
 ASTLabelType  = GrammarAST;
}

// Include the copyright in this source and also the generated source
@header {
/*
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THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
(INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
package org.antlr.v4.parse;
import org.antlr.v4.Tool;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.lang.reflect.InvocationTargetException;
import java.lang.reflect.Method;
}

@members {
public String grammarName;
public GrammarAST currentRuleAST;
public String currentModeName = LexerGrammar.DEFAULT_MODE_NAME;
public String currentRuleName;
public GrammarAST currentOuterAltRoot;
public int currentOuterAltNumber = 1; // 1..n
public int rewriteEBNFLevel = 0;

public GrammarTreeVisitor() { this(null); }

// Should be abstract but can't make gen'd parser abstract;
// subclasses should implement else everything goes to stderr!
public ErrorManager getErrorManager() { return null; }

public void visitGrammar(GrammarAST t) { visit(t, "grammarSpec"); }
public void visit(GrammarAST t, String ruleName) {
 CommonTreeNodeStream nodes = new CommonTreeNodeStream(new GrammarASTAdaptor(), t);
 setTreeNodeStream(nodes);
 try {
 Method m = getClass().getMethod(ruleName);
 m.invoke(this);
 }
 catch (Throwable e) {
 ErrorManager errMgr = getErrorManager();
 if (e instanceof InvocationTargetException) {

```
      e = e.getCause();
    }
    //e.printStackTrace(System.err);
    if ( errMgr==null ) {
     System.err.println("can't find rule "+ruleName+
          " or tree structure error: "+t.toStringTree()
          );
     e.printStackTrace(System.err);
    }
    else errMgr.toolError(ErrorType.INTERNAL_ERROR, e);
   }
  }

  public void discoverGrammar(GrammarRootAST root, GrammarAST ID) { }
  public void finishPrequels(GrammarAST firstPrequel) { }
  public void finishGrammar(GrammarRootAST root, GrammarAST ID) { }

  public void grammarOption(GrammarAST ID, GrammarAST valueAST) { }
  public void ruleOption(GrammarAST ID, GrammarAST valueAST) { }
  public void blockOption(GrammarAST ID, GrammarAST valueAST) { }
  public void defineToken(GrammarAST ID) { }
  public void defineChannel(GrammarAST ID) { }
  public void globalNamedAction(GrammarAST scope, GrammarAST ID, ActionAST action) { }
  public void importGrammar(GrammarAST label, GrammarAST ID) { }

  public void modeDef(GrammarAST m, GrammarAST ID) { }

  public void discoverRules(GrammarAST rules) { }
  public void finishRules(GrammarAST rule) { }
  public void discoverRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
       ActionAST arg, ActionAST returns, GrammarAST thrws,
       GrammarAST options, ActionAST locals,
       List<GrammarAST> actions,
       GrammarAST block) { }
  public void finishRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
  public void discoverLexerRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
                    GrammarAST block) { }
  public void finishLexerRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
  public void ruleCatch(GrammarAST arg, ActionAST action) { }
  public void finallyAction(ActionAST action) { }
  public void discoverOuterAlt(AltAST alt) { }
  public void finishOuterAlt(AltAST alt) { }
  public void discoverAlt(AltAST alt) { }
  public void finishAlt(AltAST alt) { }

  public void ruleRef(GrammarAST ref, ActionAST arg) { }
  public void tokenRef(TerminalAST ref) { }
  public void elementOption(GrammarASTWithOptions t, GrammarAST ID, GrammarAST valueAST) { }
```

```java
public void stringRef(TerminalAST ref) { }
public void wildcardRef(GrammarAST ref) { }
public void actionInAlt(ActionAST action) { }
public void sempredInAlt(PredAST pred) { }
public void label(GrammarAST op, GrammarAST ID, GrammarAST element) { }
public void lexerCallCommand(int outerAltNumber, GrammarAST ID, GrammarAST arg) { }
public void lexerCommand(int outerAltNumber, GrammarAST ID) { }

protected void enterGrammarSpec(GrammarAST tree) { }
protected void exitGrammarSpec(GrammarAST tree) { }

protected void enterPrequelConstructs(GrammarAST tree) { }
protected void exitPrequelConstructs(GrammarAST tree) { }

protected void enterPrequelConstruct(GrammarAST tree) { }
protected void exitPrequelConstruct(GrammarAST tree) { }

protected void enterOptionsSpec(GrammarAST tree) { }
protected void exitOptionsSpec(GrammarAST tree) { }

protected void enterOption(GrammarAST tree) { }
protected void exitOption(GrammarAST tree) { }

protected void enterOptionValue(GrammarAST tree) { }
protected void exitOptionValue(GrammarAST tree) { }

protected void enterDelegateGrammars(GrammarAST tree) { }
protected void exitDelegateGrammars(GrammarAST tree) { }

protected void enterDelegateGrammar(GrammarAST tree) { }
protected void exitDelegateGrammar(GrammarAST tree) { }

protected void enterTokensSpec(GrammarAST tree) { }
protected void exitTokensSpec(GrammarAST tree) { }

protected void enterTokenSpec(GrammarAST tree) { }
protected void exitTokenSpec(GrammarAST tree) { }

protected void enterChannelsSpec(GrammarAST tree) { }
protected void exitChannelsSpec(GrammarAST tree) { }

protected void enterChannelSpec(GrammarAST tree) { }
protected void exitChannelSpec(GrammarAST tree) { }

protected void enterAction(GrammarAST tree) { }
protected void exitAction(GrammarAST tree) { }

protected void enterRules(GrammarAST tree) { }
```

```java
    protected void exitRules(GrammarAST tree) { }

    protected void enterMode(GrammarAST tree) { }
    protected void exitMode(GrammarAST tree) { }

    protected void enterLexerRule(GrammarAST tree) { }
    protected void exitLexerRule(GrammarAST tree) { }

    protected void enterRule(GrammarAST tree) { }
    protected void exitRule(GrammarAST tree) { }

    protected void enterExceptionGroup(GrammarAST tree) { }
    protected void exitExceptionGroup(GrammarAST tree) { }

    protected void enterExceptionHandler(GrammarAST tree) { }
    protected void exitExceptionHandler(GrammarAST tree) { }

    protected void enterFinallyClause(GrammarAST tree) { }
    protected void exitFinallyClause(GrammarAST tree) { }

    protected void enterLocals(GrammarAST tree) { }
    protected void exitLocals(GrammarAST tree) { }

    protected void enterRuleReturns(GrammarAST tree) { }
    protected void exitRuleReturns(GrammarAST tree) { }

    protected void enterThrowsSpec(GrammarAST tree) { }
    protected void exitThrowsSpec(GrammarAST tree) { }

    protected void enterRuleAction(GrammarAST tree) { }
    protected void exitRuleAction(GrammarAST tree) { }

    protected void enterRuleModifier(GrammarAST tree) { }
    protected void exitRuleModifier(GrammarAST tree) { }

    protected void enterLexerRuleBlock(GrammarAST tree) { }
    protected void exitLexerRuleBlock(GrammarAST tree) { }

    protected void enterRuleBlock(GrammarAST tree) { }
    protected void exitRuleBlock(GrammarAST tree) { }

    protected void enterLexerOuterAlternative(AltAST tree) { }
    protected void exitLexerOuterAlternative(AltAST tree) { }

    protected void enterOuterAlternative(AltAST tree) { }
    protected void exitOuterAlternative(AltAST tree) { }

    protected void enterLexerAlternative(GrammarAST tree) { }
```

```java
    protected void exitLexerAlternative(GrammarAST tree) { }

    protected void enterLexerElements(GrammarAST tree) { }
    protected void exitLexerElements(GrammarAST tree) { }

    protected void enterLexerElement(GrammarAST tree) { }
    protected void exitLexerElement(GrammarAST tree) { }

    protected void enterLabeledLexerElement(GrammarAST tree) { }
    protected void exitLabeledLexerElement(GrammarAST tree) { }

    protected void enterLexerBlock(GrammarAST tree) { }
    protected void exitLexerBlock(GrammarAST tree) { }

    protected void enterLexerAtom(GrammarAST tree) { }
    protected void exitLexerAtom(GrammarAST tree) { }

    protected void enterActionElement(GrammarAST tree) { }
    protected void exitActionElement(GrammarAST tree) { }

    protected void enterAlternative(AltAST tree) { }
    protected void exitAlternative(AltAST tree) { }

    protected void enterLexerCommand(GrammarAST tree) { }
    protected void exitLexerCommand(GrammarAST tree) { }

    protected void enterLexerCommandExpr(GrammarAST tree) { }
    protected void exitLexerCommandExpr(GrammarAST tree) { }

    protected void enterElement(GrammarAST tree) { }
    protected void exitElement(GrammarAST tree) { }

    protected void enterAstOperand(GrammarAST tree) { }
    protected void exitAstOperand(GrammarAST tree) { }

    protected void enterLabeledElement(GrammarAST tree) { }
    protected void exitLabeledElement(GrammarAST tree) { }

    protected void enterSubrule(GrammarAST tree) { }
    protected void exitSubrule(GrammarAST tree) { }

    protected void enterLexerSubrule(GrammarAST tree) { }
    protected void exitLexerSubrule(GrammarAST tree) { }

    protected void enterBlockSuffix(GrammarAST tree) { }
    protected void exitBlockSuffix(GrammarAST tree) { }

    protected void enterEbnfSuffix(GrammarAST tree) { }
```

```
protected void exitEbnfSuffix(GrammarAST tree) { }

protected void enterAtom(GrammarAST tree) { }
protected void exitAtom(GrammarAST tree) { }

protected void enterBlockSet(GrammarAST tree) { }
protected void exitBlockSet(GrammarAST tree) { }

protected void enterSetElement(GrammarAST tree) { }
protected void exitSetElement(GrammarAST tree) { }

protected void enterBlock(GrammarAST tree) { }
protected void exitBlock(GrammarAST tree) { }

protected void enterRuleref(GrammarAST tree) { }
protected void exitRuleref(GrammarAST tree) { }

protected void enterRange(GrammarAST tree) { }
protected void exitRange(GrammarAST tree) { }

protected void enterTerminal(GrammarAST tree) { }
protected void exitTerminal(GrammarAST tree) { }

protected void enterElementOptions(GrammarAST tree) { }
protected void exitElementOptions(GrammarAST tree) { }

protected void enterElementOption(GrammarAST tree) { }
protected void exitElementOption(GrammarAST tree) { }

 @Override
 public void traceIn(String ruleName, int ruleIndex)  {
  System.err.println("enter "+ruleName+": "+input.LT(1));
 }

 @Override
 public void traceOut(String ruleName, int ruleIndex)  {
  System.err.println("exit "+ruleName+": "+input.LT(1));
 }
}

grammarSpec
@init {
 enterGrammarSpec($start);
}
@after {
 exitGrammarSpec($start);
}
  :  ^( GRAMMAR ID {grammarName=$ID.text;}
```

```
        {discoverGrammar((GrammarRootAST)$GRAMMAR, $ID);}
        prequelConstructs
        {finishPrequels($prequelConstructs.firstOne);}
        rules mode*
        {finishGrammar((GrammarRootAST)$GRAMMAR, $ID);}
    )
;


prequelConstructs returns [GrammarAST firstOne=null]
@init {
 enterPrequelConstructs($start);
}
@after {
 exitPrequelConstructs($start);
}
 : {$firstOne=$start;} prequelConstruct+
 |
 ;


prequelConstruct
@init {
 enterPrequelConstructs($start);
}
@after {
 exitPrequelConstructs($start);
}
 :  optionsSpec
   |  delegateGrammars
   |  tokensSpec
   |  channelsSpec
   |  action
   ;


optionsSpec
@init {
 enterOptionsSpec($start);
}
@after {
 exitOptionsSpec($start);
}
 : ^(OPTIONS option*)
   ;


option
@init {
 enterOption($start);
 boolean rule = inContext("RULE ...");
 boolean block = inContext("BLOCK ...");
```

```
}
@after {
 exitOption($start);
}
  :  ^(a=ASSIGN ID v=optionValue)
  {
  if ( block ) blockOption($ID, $v.start); // most specific first
  else if ( rule ) ruleOption($ID, $v.start);
  else grammarOption($ID, $v.start);
  }
  ;

optionValue returns [String v]
@init {
 enterOptionValue($start);
 $v = $start.token.getText();
}
@after {
 exitOptionValue($start);
}
  :  ID
  |  STRING_LITERAL
  |  INT
  ;

delegateGrammars
@init {
 enterDelegateGrammars($start);
}
@after {
 exitDelegateGrammars($start);
}
 :  ^(IMPORT delegateGrammar+)
 ;

delegateGrammar
@init {
 enterDelegateGrammar($start);
}
@after {
 exitDelegateGrammar($start);
}
  :  ^(ASSIGN label=ID id=ID) {importGrammar($label, $id);}
  |  id=ID      {importGrammar(null, $id);}
  ;

tokensSpec
@init {
```

```
enterTokensSpec($start);
}
@after {
exitTokensSpec($start);
}
 :  ^(TOKENS_SPEC tokenSpec+)
 ;


tokenSpec
@init {
enterTokenSpec($start);
}
@after {
exitTokenSpec($start);
}
 : ID     {defineToken($ID);}
 ;


channelsSpec
@init {
enterChannelsSpec($start);
}
@after {
exitChannelsSpec($start);
}
 :  ^(CHANNELS channelSpec+)
 ;


channelSpec
@init {
enterChannelSpec($start);
}
@after {
exitChannelSpec($start);
}
 : ID     {defineChannel($ID);}
 ;


action
@init {
enterAction($start);
}
@after {
exitAction($start);
}
 : ^(AT sc=ID? name=ID ACTION) {globalNamedAction($sc, $name, (ActionAST)$ACTION);}
 ;
```

```
rules
@init {
 enterRules($start);
}
@after {
 exitRules($start);
}
  : ^(RULES {discoverRules($RULES);} (rule|lexerRule)* {finishRules($RULES);})
  ;


mode
@init {
 enterMode($start);
}
@after {
 exitMode($start);
}
 : ^( MODE ID {currentModeName=$ID.text; modeDef($MODE, $ID);} lexerRule* )
 ;


lexerRule
@init {
 enterLexerRule($start);
 List<GrammarAST> mods = new ArrayList<GrammarAST>();
 currentOuterAltNumber=0;
}
@after {
 exitLexerRule($start);
}
 : ^( RULE TOKEN_REF
   {currentRuleName=$TOKEN_REF.text; currentRuleAST=$RULE;}
   (^(RULEMODIFIERS m=FRAGMENT {mods.add($m);}))?
     {discoverLexerRule((RuleAST)$RULE, $TOKEN_REF, mods, (GrammarAST)input.LT(1));}
     lexerRuleBlock
     {
     finishLexerRule((RuleAST)$RULE, $TOKEN_REF, $lexerRuleBlock.start);
     currentRuleName=null; currentRuleAST=null;
     }
     )
 ;


rule
@init {
 enterRule($start);
 List<GrammarAST> mods = new ArrayList<GrammarAST>();
 List<GrammarAST> actions = new ArrayList<GrammarAST>(); // track roots
 currentOuterAltNumber=0;
}
```

```
@after {
exitRule($start);
}
 :  ^( RULE RULE_REF {currentRuleName=$RULE_REF.text; currentRuleAST=$RULE;}
  (^(RULEMODIFIERS (m=ruleModifier{mods.add($m.start);})+))?
  ARG_ACTION?
    ret=ruleReturns?
    thr=throwsSpec?
    loc=locals?
    ( opts=optionsSpec
    | a=ruleAction {actions.add($a.start);}
    )*
    {discoverRule((RuleAST)$RULE, $RULE_REF, mods, (ActionAST)$ARG_ACTION,
       $ret.start!=null?(ActionAST)$ret.start.getChild(0):null,
       $thr.start, $opts.start,
       $loc.start!=null?(ActionAST)$loc.start.getChild(0):null,
       actions, (GrammarAST)input.LT(1));}
    ruleBlock exceptionGroup
    {finishRule((RuleAST)$RULE, $RULE_REF, $ruleBlock.start); currentRuleName=null; currentRuleAST=null;}
    )
  ;

exceptionGroup
@init {
enterExceptionGroup($start);
}
@after {
exitExceptionGroup($start);
}
  : exceptionHandler* finallyClause?
  ;

exceptionHandler
@init {
enterExceptionHandler($start);
}
@after {
exitExceptionHandler($start);
}
: ^(CATCH ARG_ACTION ACTION) {ruleCatch($ARG_ACTION, (ActionAST)$ACTION);}
;

finallyClause
@init {
enterFinallyClause($start);
}
@after {
exitFinallyClause($start);
```

```
}
: ^(FINALLY ACTION)    {finallyAction((ActionAST)$ACTION);}
;


locals
@init {
enterLocals($start);
}
@after {
exitLocals($start);
}
: ^(LOCALS ARG_ACTION)
;


ruleReturns
@init {
enterRuleReturns($start);
}
@after {
exitRuleReturns($start);
}
: ^(RETURNS ARG_ACTION)
;


throwsSpec
@init {
enterThrowsSpec($start);
}
@after {
exitThrowsSpec($start);
}
  : ^(THROWS ID+)
  ;


ruleAction
@init {
enterRuleAction($start);
}
@after {
exitRuleAction($start);
}
: ^(AT ID ACTION)
;


ruleModifier
@init {
enterRuleModifier($start);
}
```

```
@after {
exitRuleModifier($start);
}
  : PUBLIC
  | PRIVATE
  | PROTECTED
  | FRAGMENT
  ;

lexerRuleBlock
@init {
enterLexerRuleBlock($start);
}
@after {
exitLexerRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    lexerOuterAlternative
   )+
   )
  ;

ruleBlock
@init {
enterRuleBlock($start);
}
@after {
exitRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    outerAlternative
   )+
   )
  ;

lexerOuterAlternative
@init {
enterLexerOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
```

```
@after {
finishOuterAlt((AltAST)$start);
exitLexerOuterAlternative((AltAST)$start);
}
: lexerAlternative
;


outerAlternative
@init {
enterOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
@after {
finishOuterAlt((AltAST)$start);
exitOuterAlternative((AltAST)$start);
}
: alternative
;

lexerAlternative
@init {
enterLexerAlternative($start);
}
@after {
exitLexerAlternative($start);
}
: ^(LEXER_ALT_ACTION lexerElements lexerCommand+)
  |   lexerElements
  ;

lexerElements
@init {
enterLexerElements($start);
}
@after {
exitLexerElements($start);
}
  : ^(ALT lexerElement+)
  ;

lexerElement
@init {
enterLexerElement($start);
}
@after {
exitLexerElement($start);
}
```

```
: labeledLexerElement
| lexerAtom
| lexerSubrule
|   ACTION      {actionInAlt((ActionAST)$ACTION);}
|   SEMPRED     {sempredInAlt((PredAST)$SEMPRED);}
|   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
| EPSILON
;

labeledLexerElement
@init {
enterLabeledLexerElement($start);
}
@after {
exitLabeledLexerElement($start);
}
  :  ^((ASSIGN|PLUS_ASSIGN) ID (lexerAtom|block))
;

lexerBlock
@init {
enterLexerBlock($start);
}
@after {
exitLexerBlock($start);
}
 : ^(BLOCK optionsSpec? lexerAlternative+)
  ;

lexerAtom
@init {
enterLexerAtom($start);
}
@after {
exitLexerAtom($start);
}
  :  terminal
  |  ^(NOT blockSet)
  |  blockSet
  |  ^(WILDCARD elementOptions)
  |  WILDCARD
  | LEXER_CHAR_SET
  |  range
  |  ruleref
  ;

actionElement
```

```
@init {
enterActionElement($start);
}
@after {
exitActionElement($start);
}
 : ACTION
 |  ^(ACTION elementOptions)
 |  SEMPRED
 |  ^(SEMPRED elementOptions)
 ;

alternative
@init {
enterAlternative((AltAST)$start);
discoverAlt((AltAST)$start);
}
@after {
finishAlt((AltAST)$start);
exitAlternative((AltAST)$start);
}
 : ^(ALT elementOptions? element+)
 | ^(ALT elementOptions? EPSILON)
  ;

lexerCommand
@init {
enterLexerCommand($start);
}
@after {
exitLexerCommand($start);
}
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
     {lexerCallCommand(currentOuterAltNumber, $ID, $lexerCommandExpr.start);}
| ID
     {lexerCommand(currentOuterAltNumber, $ID);}
 ;

lexerCommandExpr
@init {
enterLexerCommandExpr($start);
}
@after {
exitLexerCommandExpr($start);
}
 : ID
| INT
 ;
```

```
element
@init {
enterElement($start);
}
@after {
exitElement($start);
}
 : labeledElement
| atom
| subrule
|   ACTION      {actionInAlt((ActionAST)$ACTION);}
|   SEMPRED     {sempredInAlt((PredAST)$SEMPRED);}
|   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}

| ^(NOT blockSet)
| ^(NOT block)
;

astOperand
@init {
enterAstOperand($start);
}
@after {
exitAstOperand($start);
}
 : atom
| ^(NOT blockSet)
| ^(NOT block)
;

labeledElement
@init {
enterLabeledElement($start);
}
@after {
exitLabeledElement($start);
}
 : ^((ASSIGN|PLUS_ASSIGN) ID element) {label($start, $ID, $element.start);}
;

subrule
@init {
enterSubrule($start);
}
@after {
exitSubrule($start);
```

```
}
 : ^(blockSuffix block)
| block
 ;

lexerSubrule
@init {
 enterLexerSubrule($start);
}
@after {
 exitLexerSubrule($start);
}
 : ^(blockSuffix lexerBlock)
| lexerBlock
 ;

blockSuffix
@init {
 enterBlockSuffix($start);
}
@after {
 exitBlockSuffix($start);
}
  : ebnfSuffix
  ;

ebnfSuffix
@init {
 enterEbnfSuffix($start);
}
@after {
 exitEbnfSuffix($start);
}
 : OPTIONAL
 | CLOSURE
  | POSITIVE_CLOSURE
 ;

atom
@init {
 enterAtom($start);
}
@after {
 exitAtom($start);
}
 : ^(DOT ID terminal)
| ^(DOT ID ruleref)
  | ^(WILDCARD elementOptions) {wildcardRef($WILDCARD);}
```

```
| WILDCARD      {wildcardRef($WILDCARD);}
|  terminal
| blockSet
|  ruleref
;


blockSet
@init {
 enterBlockSet($start);
}
@after {
 exitBlockSet($start);
}
 : ^(SET setElement+)
 ;


setElement
@init {
 enterSetElement($start);
}
@after {
 exitSetElement($start);
}
 : ^(STRING_LITERAL elementOptions)    {stringRef((TerminalAST)$STRING_LITERAL);}
| ^(TOKEN_REF elementOptions)   {tokenRef((TerminalAST)$TOKEN_REF);}
| STRING_LITERAL            {stringRef((TerminalAST)$STRING_LITERAL);}
| TOKEN_REF            {tokenRef((TerminalAST)$TOKEN_REF);}
| ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
 {
 stringRef((TerminalAST)$a);
 stringRef((TerminalAST)$b);
 }
     |     LEXER_CHAR_SET
;


block
@init {
 enterBlock($start);
}
@after {
 exitBlock($start);
}
  : ^(BLOCK optionsSpec? ruleAction* ACTION? alternative+)
  ;


ruleref
@init {
 enterRuleref($start);
```

```
}
@after {
 exitRuleref($start);
}
  : ^(RULE_REF arg=ARG_ACTION? elementOptions?)
   {
   ruleRef($RULE_REF, (ActionAST)$ARG_ACTION);
   if ( $arg!=null ) actionInAlt((ActionAST)$arg);
   }
  ;

range
@init {
 enterRange($start);
}
@after {
 exitRange($start);
}
  : ^(RANGE STRING_LITERAL STRING_LITERAL)
  ;

terminal
@init {
 enterTerminal($start);
}
@after {
 exitTerminal($start);
}
  :  ^(STRING_LITERAL elementOptions)
       {stringRef((TerminalAST)$STRING_LITERAL);}
  | STRING_LITERAL    {stringRef((TerminalAST)$STRING_LITERAL);}
  | ^(TOKEN_REF elementOptions) {tokenRef((TerminalAST)$TOKEN_REF);}
  | TOKEN_REF       {tokenRef((TerminalAST)$TOKEN_REF);}
  ;

elementOptions
@init {
 enterElementOptions($start);
}
@after {
 exitElementOptions($start);
}
  : ^(ELEMENT_OPTIONS elementOption[(GrammarASTWithOptions)$start.getParent()]*)
  ;

elementOption[GrammarASTWithOptions t]
@init {
 enterElementOption($start);
```

```
}
@after {
 exitElementOption($start);
}
  : ID      {elementOption(t, $ID, null);}
  | ^(ASSIGN id=ID v=ID)   {elementOption(t, $id, $v);}
  | ^(ASSIGN ID v=STRING_LITERAL) {elementOption(t, $ID, $v);}
  | ^(ASSIGN ID v=ACTION)   {elementOption(t, $ID, $v);}
  | ^(ASSIGN ID v=INT)    {elementOption(t, $ID, $v);}
  ;
```

Found in path(s):

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/GrammarTreeVisitor.g

No license file was found, but licenses were detected in source scan.

```
/** ANTLR tool checks output templates are compatible with tool code generation.
```

```
 *  For now, a simple string match used on x.y of x.y.z scheme.
 *  Must match Tool.VERSION during load to templates.
 *
 *  REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
<if(file.genListener)>
var <file.grammarName>Listener = require('./<file.grammarName>Listener').<file.grammarName>Listener;
<endif>
<if(file.genVisitor)>
var <file.grammarName>Visitor = require('./<file.grammarName>Visitor').<file.grammarName>Visitor;
<endif>

<namedActions.header>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete listener for a parse tree produced by <file.parserName>.
function <file.grammarName>Listener() {
 antlr4.tree.ParseTreeListener.call(this);
 return this;
}

<file.grammarName>Listener.prototype = Object.create(antlr4.tree.ParseTreeListener.prototype);
<file.grammarName>Listener.prototype.constructor = <file.grammarName>Listener;

<file.listenerNames:{lname |
// Enter a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.enter<lname; format="cap"> = function(ctx) {
\};
```

```
// Exit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.exit<lname; format="cap"> = function(ctx) {
\};

}; separator="\n">

exports.<file.grammarName>Listener = <file.grammarName>Listener;
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

function <file.grammarName>Visitor() {
 antlr4.tree.ParseTreeVisitor.call(this);
 return this;
}

<file.grammarName>Visitor.prototype = Object.create(antlr4.tree.ParseTreeVisitor.prototype);
<file.grammarName>Visitor.prototype.constructor = <file.grammarName>Visitor;

<file.visitorNames:{lname |
// Visit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Visitor.prototype.visit<lname; format="cap"> = function(ctx) {
 return this.visitChildren(ctx);
\};

}; separator="\n">

exports.<file.grammarName>Visitor = <file.grammarName>Visitor;
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
// jshint ignore: start
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

var grammarFileName = "<parser.grammarFileName; format="java-escape">";
```

```
<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

var sharedContextCache = new antlr4.PredictionContextCache();

var literalNames = [ <parser.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

function <parser.name> (input) {
 <superClass; null="antlr4.Parser">.call(this, input);
   this._interp = new antlr4.atn.ParserATNSimulator(this, atn, decisionsToDFA, sharedContextCache);
   this.ruleNames = ruleNames;
   this.literalNames = literalNames;
   this.symbolicNames = symbolicNames;
 <namedActions.members>
   return this;
}

<parser.name>.prototype = Object.create(<superClass; null="antlr4.Parser">.prototype);
<parser.name>.prototype.constructor = <parser.name>;

Object.defineProperty(<parser.name>.prototype, "atn", {
 get : function() {
  return atn;
 }
});

<parser.name>.EOF = antlr4.Token.EOF;
<if(parser.tokens)>
<parser.tokens:{k | <parser.name>.<k> = <parser.tokens.(k)>;}; separator="\n", wrap, anchor>
<endif>

<parser.rules:{r | <parser.name>.RULE_<r.name> = <r.index>;}; separator="\n", wrap, anchor>

<funcs; separator="\n">

<if(sempredFuncs)>
<parser.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch(ruleIndex) {
 <parser.sempredFuncs.values:{f | case <f.ruleIndex>:
  return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
```

```
      throw "No predicate with index:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>

exports.<parser.name> = <parser.name>;

>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
<lexer.name>.prototype.action = function(localctx, ruleIndex, actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 this.<f.name>_action(localctx, actionIndex);
 break;}; separator="\n">
 default:
  throw "No registered action for:" + ruleIndex;
 }
};

<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
<lexer.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch (ruleIndex) {
  <recog.sempredFuncs.values:{f| case <f.ruleIndex>:
 return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
    throw "No registered predicate for:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

<lexer.name>.prototype.<r.name>_action = function(localctx , actionIndex) {
 switch (actionIndex) {
```

```
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 default:
  throw "No registered action for:" + actionIndex;
 }
};
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
<if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>.prototype.<r.name>_sempred = function(localctx,
predIndex) {
 switch(predIndex) {
  <actions:{index| case <index>:
 return <actions.(index)>;}; separator="\n">
  default:
   throw "No predicate with index:" + predIndex;
 }
};


>>


RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<! Define fields of this parser to export the context classes !>
<parser.name>.<currentRule.ctxType> = <currentRule.ctxType>;

<parser.name>.prototype.<currentRule.name> = function(<currentRule.args:{a | <a.name>}; separator=", ">) {

  var localctx = new <currentRule.ctxType>(this, this._ctx, this.state<currentRule.args:{a | , <a.name>}>);
  this.enterRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
    <code>
    <postamble; separator="\n">
    <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
```

```
    <else>
    } catch (re) {
    if(re instanceof antlr4.error.RecognitionException) {
        localctx.exception = re;
        this._errHandler.reportError(this, re);
        this._errHandler.recover(this, re);
    } else {
        throw re;
    }
    }<endif> finally {
        <finallyAction>
        this.exitRule();
    }
    return localctx;
};

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<parser.name>.prototype.<currentRule.name> = function(_p<if(currentRule.args)>, <args:{a | , <a>}><endif>) {
if(_p===undefined) {
    _p = 0;
}
    var _parentctx = this._ctx;
    var _parentState = this.state;
    var localctx = new <currentRule.ctxType>(this, this._ctx, _parentState<args:{a | , <a.name>}>);
    var _prevctx = localctx;
    var _startState = <currentRule.startState>;
    this.enterRecursionRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p);
    <namedActions.init>
    <locals; separator="\n">
    try {
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    } catch( error) {
        if(error instanceof antlr4.error.RecognitionException) {
            localctx.exception = error;
            this._errHandler.reportError(this, error);
            this._errHandler.recover(this, error);
        } else {
            throw error;
```

```
        }
    } finally {
        <finallyAction>
        this.unrollRecursionContexts(_parentctx)
    }
    return localctx;
};

>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(this, localctx);<endif>
this.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = this._input.LT(1);<endif>
<preamble; separator="\n">
switch(this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
    <alt>
    break;}; separator="\n">
default:
    <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
switch (this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>
```

```
LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
if(<expr>) {
  <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
while(<loopExpr>) {
  <alts; separator="\n">
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
<preamble; separator="\n">
do {
  <alts; separator="\n">
  this.state = <choice.stateNumber>; <! loopback/exit decision !>
  this._errHandler.sync(this);
  <iteration>
} while(<loopExpr>);
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
switch(la_) {
<alts:{alt |
case <i>:
  <alt>
  break;
```

```
}; separator="\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
<alts:{alt |
if(la_===<i><if(!choice.ast.greedy)>+1<endif>) {
  <alt>
}; separator="\n} else ">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx)
while(_alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER) {
  if(_alt===1<if(!choice.ast.greedy)>+1<endif>) {
     <iteration>
     <alts> <! should only be one !>
  }
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
}

>>


PlusBlock(choice, alts, error) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
var _alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 this.state = <choice.loopBackStateNumber>; <! loopback/exit decision !>
 this._errHandler.sync(this);
 _alt = this._interp.adaptivePredict(this._input,<choice.decision>, this._ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER );
```

```
>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "throw new antlr4.error.NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>

// Javascript language spec - shift operators are 32 bits long max
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x1f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>===<parser.name>.<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <parser.name>.<t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
this.state = <r.stateNumber>;
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>this.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
```

```
nks>);
>>


MatchToken(m) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this.match(<parser.name>.<m.name>);
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>this._input.LT(1);<endif>
<capture>
<if(invert)>if(<m.varName>\<=0 || <expr>)<else>if(!(<expr>))<endif> {
   <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this._errHandler.recoverInline(this);
}
else {
 this._errHandler.reportMatch(this);
   this.consume();
}
>>


Wildcard(w) ::= <<
this.state = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
this.state = <p.stateNumber>;
if (!( <chunks>)) {
   throw new antlr4.error.FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
}
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
```

\>>

// lexer actions are not associated with model objects

LexerSkipCommand() ::= "this.skip()"
LexerMoreCommand() ::= "this.more()"
LexerPopModeCommand() ::= "this.popMode()"
LexerTypeCommand(arg, grammar)   ::= "this._type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "this._channel = <arg>"
LexerModeCommand(arg, grammar)   ::= "this._mode = <arg>"
LexerPushModeCommand(arg, grammar) ::= "this.pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>===null ? null : <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.type)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : parseInt(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r) ::= "(<ctx(r)>.<r.label>===null ? null : this._input.getText(new
antlr4.Interval(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "this._input.getText(new antlr4.Interval(localctx.start, this._input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.push(<labelref(a.label)>);"

TokenDecl(t) ::= "this.<t.name> = null; // <TokenLabelType()>"
TokenTypeDecl(t) ::= "var <t.name> = 0; // <TokenLabelType()> type"
TokenListDecl(t) ::= "this.<t.name> = []; // of <TokenLabelType()>s"
RuleContextDecl(r) ::= "this.<r.name> = null; // <r.ctxName>"
RuleContextListDecl(rdecl) ::= "this.<rdecl.name> = []; // of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)   ::= <<
<t.name> = function() {
  return this.getToken(<parser.name>.<t.name>, 0);
};
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<
<t.name> = function(i) {
 if(i===undefined) {
 i = null;
 }
  if(i===null) {
     return this.getTokens(<parser.name>.<t.name>);
  } else {
     return this.getToken(<parser.name>.<t.name>, i);
  }
};

>>

ContextRuleGetterDecl(r)   ::= <<
<r.name> = function() {
  return this.getTypedRuleContext(<r.ctxName>,0);
};
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

```
>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
<r.name> = function(i) {
  if(i===undefined) {
    i = null;
  }
  if(i===null) {
    return this.getTypedRuleContexts(<r.ctxName>);
  } else {
    return this.getTypedRuleContext(<r.ctxName>,i);
  }
};
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = this._input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
function <struct.name>(parser, parent, invokingState<struct.ctorAttrs:{a | , <a.name>}>) {
 if(parent===undefined) {
    parent = null;
 }
 if(invokingState===undefined || invokingState===null) {
 invokingState = -1;
 }
 <if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.call(this, parent,
invokingState);
  this.parser = parser;
  this.ruleIndex = <parser.name>.RULE_<struct.derivedFromName>;
  <attrs:{a | <a>}; separator="\n">
  <struct.ctorAttrs:{a | this.<a.name> = <a.name> || null;}; separator="\n">
  return this;
}

<struct.name>.prototype =
```

```
Object.create(<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
<struct.name>.prototype.copyFrom = function(ctx) {
<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype.copyFrom.call(this,
ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
};
<endif>
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
function <struct.name>(parser, ctx) {
 <currentRule.name; format="cap">Context.call(this, parser);
   <attrs:{a | <a>;}; separator="\n">
   <currentRule.name; format="cap">Context.prototype.copyFrom.call(this, ctx);
   return this;
}

<struct.name>.prototype = Object.create(<currentRule.name; format="cap">Context.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<! Define fields of this parser to export this struct/context class !>
<parser.name>.<struct.name> = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">
<dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
<struct.name>.prototype.<if(method.isEnter)>enter<else>exit<endif>Rule = function(listener) {
   if(listener instanceof <parser.grammarName>Listener ) {
      listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
 }
};

>>

VisitorDispatchMethod(method) ::= <<
<struct.name>.prototype.accept = function(visitor) {
   if ( visitor instanceof <parser.grammarName>Visitor ) {
```

```
      return visitor.visit<struct.derivedFromName; format="cap">(this);
  } else {
      return visitor.visitChildren(this);
  }
};

>>


AttributeDecl(d) ::= "this.<d.name> = <if(d.initValue)><d.initValue><else>null<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "this.precpred(this._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "this._ctx.stop = this._input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = new <ctxName>Context(this, _parentctx, _parentState);
<if(label)>localctx.<label> = _prevctx;<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = new <currentAltLabel; format="cap">Context(this, new <ruleName; format="cap">Context(this,
_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
localctx.<label>.push(_prevctx);
<else>
localctx.<label> = _prevctx;
<endif>
<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = new <ctxName>Context(this, localctx);
this._ctx = localctx;
_prevctx = localctx;
>>

recRuleSetPrevCtx() ::= <<
if(this._parseListeners!==null) {
```

```
    this.triggerExitRuleEvent();
}
_prevctx = localctx;
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
var antlr4 = require('antlr4/index');

<namedActions.header>

<lexer>

>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

function <lexer.name>(input) {
 <if(superClass)><superClass><else>antlr4.Lexer<endif>.call(this, input);
   this._interp = new antlr4.atn.LexerATNSimulator(this, atn, decisionsToDFA, new
antlr4.PredictionContextCache());
   return this;
}

<lexer.name>.prototype = Object.create(<if(superClass)><superClass><else>antlr4.Lexer<endif>.prototype);
<lexer.name>.prototype.constructor = <lexer.name>;

<lexer.name>.EOF = antlr4.Token.EOF;
<lexer.tokens:{k | <lexer.name>.<k> = <lexer.tokens.(k)>;}; separator="\n", wrap, anchor>

<rest(lexer.modes):{m| <lexer.name>.<m> = <i>;}; separator="\n">

<lexer.name>.prototype.modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.literalNames = [ <lexer.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

<lexer.name>.prototype.symbolicNames = [ <lexer.symbolicNames:{t | <t>}; null="null", separator=", ", wrap,
anchor> ];

<lexer.name>.prototype.ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];
```

```
<lexer.name>.prototype.grammarFileName = "<lexer.grammarFileName>";

<namedActions.members>

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

exports.<lexer.name> = <lexer.name>;

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

var serializedATN = ["<model.serialized; wrap={",<\n>    "}>"].join("");

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".js"
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/JavaScript/JavaScript.stg
No license file was found, but licenses were detected in source scan.

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.Text;
using System.Diagnostics;
using System.Collections.Generic;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using DFA = Antlr4.Runtime.Dfa.DFA;

<parser>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using IParseTreeListener = Antlr4.Runtime.Tree.IParseTreeListener;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
```

```
/// This interface defines a complete listener for a parse tree produced by
/// \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Listener : IParseTreeListener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>

using Antlr4.Runtime.Misc;
using IErrorNode = Antlr4.Runtime.Tree.IErrorNode;
using ITerminalNode = Antlr4.Runtime.Tree.ITerminalNode;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;
```

```
/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Listener"/>,
/// which can be extended to create a listener which only needs to handle a subset
/// of the available methods.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseListener : I<file.grammarName>Listener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}}; separator="\n">

 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void EnterEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void ExitEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitTerminal([NotNull] ITerminalNode node) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitErrorNode([NotNull] IErrorNode node) { }
}
<if(file.genPackage)>
```

```
} // namespace <file.genPackage>
<endif>
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;


/// \<summary>
/// This interface defines a complete generic visitor for a parse tree produced
/// by \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Visitor\<Result> : IParseTreeVisitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
```

```
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;


/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Visitor{Result}"/>,
/// which can be extended to create a visitor which only needs to handle a subset
/// of the available methods.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseVisitor\<Result> : AbstractParseTreeVisitor\<Result>,
I<file.grammarName>Visitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c>\<lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>
/// The default implementation returns the result of calling \<see
cref="AbstractParseTreeVisitor{Result\}.VisitChildren(IRuleNode)"/>
/// on \<paramref name="context"/>.
/// \</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
public virtual Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { return VisitChildren(context); \}}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------
```

```
// Generated from <grammarFileName> by ANTLR <ANTLRVersion>

// Unreachable code detected
#pragma warning disable 0162
// The variable '...' is assigned but its value is never used
#pragma warning disable 0219
// Missing XML comment for publicly visible type or member '...'
#pragma warning disable 1591
// Ambiguous reference in cref attribute
#pragma warning disable 419

>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(parser.name)> : <superClass; null="Parser"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 <if(parser.tokens)>
 public const int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public const int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 public static readonly string[] ruleNames = {
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 public override string GrammarFileName { get { return "<parser.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }

 public override string SerializedAtn { get { return _serializedATN; } }

 static <csIdentifier.(parser.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }
```

```
 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>: return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
 }
 >>

vocabulary(literalNames, symbolicNames) ::= <<
private static readonly string[] _LiteralNames = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static readonly string[] _SymbolicNames = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static readonly IVocabulary DefaultVocabulary = new Vocabulary(_LiteralNames, _SymbolicNames);

[NotNull]
public override IVocabulary Vocabulary
{
 get
 {
  return DefaultVocabulary;
 }
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
public override void Action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex> : <f.name>_action(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, actionIndex); break;};
separator="\n">
 }
}
```

```
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex> : return <f.name>_sempred(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, predIndex);};
separator="\n">
 }
 return true;
 }
<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(parser) ::= <<
public <csIdentifier.(parser.name)>(ITokenStream input)
 : base(input)
{
 Interpreter = new ParserATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>: <actions.(index)> break;}; separator="\n">
 }
 }
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private bool <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>: return <actions.(index)>;}; separator="\n">
 }
 return true;
 }
>>
```

```
RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<if(ruleCtx)>
<ruleCtx>
<endif>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
 <endif>
 finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
 }
>>

LeftFactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
```

```
EnterLeftFactoredRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
<namedActions.init>
<locals; separator="\n">
try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
 }
>>

// This behaves similar to RuleFunction (enterRule is called, and no adjustments
// are made to the parse tree), but since it's still a variant no context class
// needs to be generated.
LeftUnfactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
```

```
    ErrorHandler.Recover(this, re);
  }
 finally {
  <finallyAction>
  ExitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 return <csIdentifier.(currentRule.name)>(0<currentRule.args:{a | , <csIdentifier.(a.name)>}>);
}

private <currentRule.ctxType> <csIdentifier.(currentRule.name)>(int _p<args:{a | , <a>}>) {
 ParserRuleContext _parentctx = Context;
 int _parentState = State;
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, _parentState<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 EnterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
  int _alt;
<endif>
  <code>
  <postamble; separator="\n">
  <namedActions.after>
 }
 catch (RecognitionException re) {
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
```

```
 UnrollRecursionContexts(_parentctx);
 }
 return _localctx;
 }
 >>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
EnterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
```

```
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 State = <choice.stateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 <iteration>
} while ( <loopExpr> );
>>


// LL(*) stuff


AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>
```

```
OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
_alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
}
>>


PlusBlock(choice, alts, error) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 State = <choice.loopBackStateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
} while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "Sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"
```

```
TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>) && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(tokenType.(ttype), bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<tokenType.(ttype)>}; separator=" || ">
%>


cases(ttypes) ::= <<
<ttypes:{t | case <tokenType.(t)>:}; separator="\n">
>>


InvokeRule(r, argExprsChunks) ::= <<
State = <r.stateNumber>; <if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><csIdentifier.(r.name)>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><arg
ExprsChunks>);
>>


MatchToken(m) ::= <<
State = <m.stateNumber>; <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>Match(<tokenType.(m.name)>);
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"
```

```
CommonSetStuff(m, expr, capture, invert) ::= <<
State = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>TokenStream.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>ErrorHandler.RecoverInline(this);
}
else {
 ErrorHandler.ReportMatch(this);
  Consume();
}
>>


Wildcard(w) ::= <<
State = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>MatchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
State = <p.stateNumber>;
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "Skip();"
LexerMoreCommand()  ::= "More();"
LexerPopModeCommand() ::= "PopMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <tokenType.(arg)>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <channelName.(arg)>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <modeName.(arg)>;"
LexerPushModeCommand(arg, grammar) ::= "PushMode(<modeName.(arg)>);"
```

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
LocalRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
RetValueRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<csIdentifier.(a.name)>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<csIdentifier.(tokenType.(t.name))>"
LabelRef(t) ::= "<ctx(t)>.<csIdentifier.(t.name)>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(csIdentifier.(t.name))>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<csIdentifier.(s.name)> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={IToken}>"
InputSymbolType() ::= "<file.InputSymbolType; null={IToken}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Text:null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Type:0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Line:0)"
TokenPropertyRef_pos(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.CharPositionInLine:0)"
TokenPropertyRef_channel(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Channel:0)"
TokenPropertyRef_index(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.TokenIndex:0)"
TokenPropertyRef_int(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?int.Parse(<ctx(t)>.<tokenType.(t.label)>.Text):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Start):null)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_text(r) ::=
"(<ctx(r)>.<r.label>!=null?TokenStream.GetText(<ctx(r)>.<r.label>.Start,<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.Start"
ThisRulePropertyRef_stop(r) ::= "_localctx.Stop"
ThisRulePropertyRef_text(r) ::= "TokenStream.GetText(_localctx.Start, TokenStream.LT(-1))"
ThisRulePropertyRef_ctx(r)   ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= <%((<s.ruleName;
format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)>%>
SetNonLocalAttr(s, rhsChunks)   ::=
 <%((<s.ruleName; format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)> =
<rhsChunks>;%>

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.Add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <csIdentifier.(tokenType.(t.name))>"
TokenTypeDecl(t) ::= "int <csIdentifier.(tokenType.(t.name))>;"
TokenListDecl(t) ::= "IList\<IToken> <csIdentifier.(tokenType.(t.name))> = new List\<IToken>()"
RuleContextDecl(r) ::= "<r.ctxName> <csIdentifier.(r.name)>"
RuleContextListDecl(rdecl) ::= "IList\<<rdecl.ctxName>> <csIdentifier.(rdecl.name)> = new
List\<<rdecl.ctxName>>()"

contextGetterCollection(elementType) ::= <%
<elementType>[]
%>

ContextTokenGetterDecl(t)   ::=
  "public ITerminalNode <csIdentifier.(tokenType.(t.name))>() { return
GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, 0); }"
ContextTokenListGetterDecl(t) ::= <<
public <contextGetterCollection("ITerminalNode")> <csIdentifier.(tokenType.(t.name))>() { return
GetTokens(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>); }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
public ITerminalNode <csIdentifier.(tokenType.(t.name))>(int i) {
 return GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>() {
 return GetRuleContext\<<r.ctxName>\>(0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public <contextGetterCollection({<r.ctxName>})> <csIdentifier.(r.name)>() {
 return GetRuleContexts\<<r.ctxName>\>();
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>(int i) {
 return GetRuleContext\<<r.ctxName>\>(i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenType.(tokenName)>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"

```
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "_<label>"


CaptureNextToken(d) ::= "<d.varName> = TokenStream.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = TokenStream.LA(1);"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
        superClass={ParserRuleContext}) ::= <<
public partial class <struct.name> :
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) : base(parent, invokingState) {
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>)
  : base(parent, invokingState)
 {
  <struct.ctorAttrs:{a | this.<csIdentifier.(a.name)> = <csIdentifier.(a.name)>;}; separator="\n">
 }
 public override int RuleIndex { get { return RULE_<struct.derivedFromName>; } }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public virtual void CopyFrom(<struct.name> context) {
  base.CopyFrom(context);
  <struct.attrs:{a | this.<csIdentifier.(a.name)> = context.<csIdentifier.(a.name)>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public partial class <struct.name> : <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context context) { CopyFrom(context); }
 <dispatchMethods; separator="\n">
}
>>


ListenerDispatchMethod(method) ::= <<
public override void <if(method.isEnter)>Enter<else>Exit<endif>Rule(IParseTreeListener listener) {
 I<parser.grammarName>Listener typedListener = listener as I<parser.grammarName>Listener;
 if (typedListener != null) typedListener.<if(method.isEnter)>Enter<else>Exit<endif><struct.derivedFromName;
format="cap">(this);
}
```

```
>>

VisitorDispatchMethod(method) ::= <<
public override TResult Accept\<TResult>(IParseTreeVisitor\<TResult> visitor) {
 I<parser.grammarName>Visitor\<TResult> typedVisitor = visitor as I<parser.grammarName>Visitor\<TResult>;
 if (typedVisitor != null) return typedVisitor.Visit<struct.derivedFromName; format="cap">(this);
 else return visitor.VisitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <csIdentifier.(d.name)><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)><typedContext(x.ctx)>.<endif><csIdentifier.(x.name)>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "<typedContext(actionChunk.ctx)>"

// only casts _localctx to the type when the cast isn't redundant (i.e. to a sub-context for a labeled alt)
typedContext(ctx) ::= "<if(ctx.provideCopyFrom)>((<ctx.name>)_localctx)<else>_localctx<endif>"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "Precpred(Context, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()              ::= "Context.Stop = TokenStream.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.Add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.Add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
```

```
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
Context = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( ParseListeners!=null )
 TriggerExitRuleEvent();
_prevctx = _localctx;
>>


LexerFile(file, lexer, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.Text;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using DFA = Antlr4.Runtime.Dfa.DFA;

<lexer>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(lexer.name)> : <superClass; null="Lexer"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 public const int
  <lexer.tokens:{k | <tokenType.(k)>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
 <if(lexer.channels)>
 public const int
  <lexer.channels:{k | <csIdentifier.(k)>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 <rest(lexer.modes):{m| public const int <modeName.(m)> = <i>;}; separator="\n">
```

```
public static string[] modeNames = {
<lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

public static readonly string[] ruleNames = {
<lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<namedActions.members>

public <csIdentifier.(lexer.name)>(ICharStream input)
: base(input)
{
Interpreter = new LexerATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

public override string GrammarFileName { get { return "<lexer.grammarFileName>"; } }

public override string[] RuleNames { get { return ruleNames; } }

public override string[] ModeNames { get { return modeNames; } }

public override string SerializedAtn { get { return _serializedATN; } }

static <csIdentifier.(lexer.name)>() {
decisionToDFA = new DFA[_ATN.NumberOfDecisions];
for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
}
}
<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
}
>>


SerializedATN(model) ::= <<
private static string _serializedATN = _serializeATN();
private static string _serializeATN()
{
  StringBuilder sb = new StringBuilder();
  sb.Append("<model.serialized; wrap={");<\n><\t>sb.Append("}>");
  return sb.ToString();
}

public static readonly ATN _ATN =
```

```
new ATNDeserializer().Deserialize(_serializedATN.ToCharArray());


>>

initValue(typeName) ::= <<
default(<typeName>)
>>

codeFileExtension() ::= ".cs"

modeName ::= [
 "DEFAULT_MODE" : "DefaultMode",
 default : key
]

channelName ::= [
 "HIDDEN" : "Hidden",
 "DEFAULT_TOKEN_CHANNEL" : "DefaultTokenChannel",
 default : key
]

tokenType ::= [
 "EOF" : "Eof",
 default : key
]

csIdentifier ::= [
 "abstract" : "@abstract",
 "as" : "@as",
 "base" : "@base",
 "bool" : "@bool",
 "break" : "@break",
 "byte" : "@byte",
 "case" : "@case",
 "catch" : "@catch",
 "char" : "@char",
 "checked" : "@checked",
 "class" : "@class",
 "const" : "@const",
 "continue" : "@continue",
 "decimal" : "@decimal",
 "default" : "@default",
 "delegate" : "@delegate",
 "do" : "@do",
 "double" : "@double",
 "else" : "@else",
 "enum" : "@enum",
```

```
"event" : "@event",
"explicit" : "@explicit",
"extern" : "@extern",
"false" : "@false",
"finally" : "@finally",
"fixed" : "@fixed",
"float" : "@float",
"for" : "@for",
"foreach" : "@foreach",
"goto" : "@goto",
"if" : "@if",
"implicit" : "@implicit",
"in" : "@in",
"int" : "@int",
"interface" : "@interface",
"internal" : "@internal",
"is" : "@is",
"lock" : "@lock",
"long" : "@long",
"namespace" : "@namespace",
"new" : "@new",
"null" : "@null",
"object" : "@object",
"operator" : "@operator",
"out" : "@out",
"override" : "@override",
"params" : "@params",
"private" : "@private",
"protected" : "@protected",
"public" : "@public",
"readonly" : "@readonly",
"ref" : "@ref",
"return" : "@return",
"sbyte" : "@sbyte",
"sealed" : "@sealed",
"short" : "@short",
"sizeof" : "@sizeof",
"stackalloc" : "@stackalloc",
"static" : "@static",
"string" : "@string",
"struct" : "@struct",
"switch" : "@switch",
"this" : "@this",
"throw" : "@throw",
"true" : "@true",
"try" : "@try",
"typeof" : "@typeof",
"uint" : "@uint",
```

"ulong" : "@ulong",
"unchecked" : "@unchecked",
"unsafe" : "@unsafe",
"ushort" : "@ushort",
"using" : "@using",
"virtual" : "@virtual",
"void" : "@void",
"volatile" : "@volatile",
"while" : "@while",
default : key
]

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/CSharp/CSharp.stg
No license file was found, but licenses were detected in source scan.

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*/

/** Find left-recursive rules */

```
tree grammar LeftRecursiveRuleWalker;

options {
 tokenVocab=ANTLRParser;
   ASTLabelType=GrammarAST;
}

@header {
package org.antlr.v4.parse;

import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
private String ruleName;
private int currentOuterAltNumber; // which outer alt of rule?
public int numAlts;  // how many alts for this rule total?

public void setAltAssoc(AltAST altTree, int alt) {}
public void binaryAlt(AltAST altTree, int alt) {}
public void prefixAlt(AltAST altTree, int alt) {}
public void suffixAlt(AltAST altTree, int alt) {}
public void otherAlt(AltAST altTree, int alt) {}
public void setReturnValues(GrammarAST t) {}
}

@rulecatch { }

// TODO: can get parser errors for not matching pattern; make them go away
public
rec_rule returns [boolean isLeftRec]
@init
{
 currentOuterAltNumber = 1;
}
 : ^( r=RULE id=RULE_REF {ruleName=$id.getText();}
   ruleModifier?
//   (ARG_ACTION)? shouldn't allow args, right?
   (^(RETURNS a=ARG_ACTION {setReturnValues($a);}))?
//     ( ^(THROWS .+) )? don't allow
     ( ^(LOCALS ARG_ACTION) )? // TODO: copy these to gen'd code
     ( ^(OPTIONS .*)
     |  ^(AT ID ACTION) // TODO: copy
     )*
   ruleBlock {$isLeftRec = $ruleBlock.isLeftRec;}
   exceptionGroup
```

```
)
;

exceptionGroup
  : exceptionHandler* finallyClause?
  ;

exceptionHandler
 : ^(CATCH ARG_ACTION ACTION)
 ;

finallyClause
 : ^(FINALLY ACTION)
 ;

ruleModifier
  : PUBLIC
  | PRIVATE
  | PROTECTED
  ;

ruleBlock returns [boolean isLeftRec]
@init{boolean lr=false; this.numAlts = $start.getChildCount();}
 : ^( BLOCK
  (
   o=outerAlternative
   {if ($o.isLeftRec) $isLeftRec = true;}
   {currentOuterAltNumber++;}
  )+
 )
 ;

/** An alt is either prefix, suffix, binary, or ternary operation or "other" */
outerAlternative returns [boolean isLeftRec]
  :  (binary)=>       binary
                {binaryAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
  | (prefix)=>       prefix
                {prefixAlt((AltAST)$start, currentOuterAltNumber);}
  | (suffix)=>       suffix
                {suffixAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
  | nonLeftRecur      {otherAlt((AltAST)$start,  currentOuterAltNumber);}
  ;

binary
 : ^( ALT elementOptions? recurse element* recurse epsilonElement* )
    {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;
```

```
prefix
 : ^( ALT elementOptions?
   element+
   recurse epsilonElement*
   )
      {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;


suffix
   :  ^( ALT elementOptions? recurse element+ )
      {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
   ;


nonLeftRecur
   :  ^(ALT elementOptions? element+)
   ;


recurse
 : ^(ASSIGN ID recurseNoLabel)
 | ^(PLUS_ASSIGN ID recurseNoLabel)
 | recurseNoLabel
 ;


recurseNoLabel : {((CommonTree)input.LT(1)).getText().equals(ruleName)}? RULE_REF;


token returns [GrammarAST t=null]
 : ^(ASSIGN ID s=token {$t = $s.t;})
 | ^(PLUS_ASSIGN ID s=token {$t = $s.t;})
 | b=STRING_LITERAL       {$t = $b;}
   | ^(b=STRING_LITERAL elementOptions) {$t = $b;}
   | ^(c=TOKEN_REF elementOptions)   {$t = $c;}
 | c=TOKEN_REF           {$t = $c;}
 ;


elementOptions
   : ^(ELEMENT_OPTIONS elementOption*)
   ;


elementOption
   : ID
   |  ^(ASSIGN ID ID)
   |  ^(ASSIGN ID STRING_LITERAL)
   |  ^(ASSIGN ID ACTION)
   |  ^(ASSIGN ID INT)
   ;


element
 : atom
```

```
| ^(NOT element)
| ^(RANGE atom atom)
| ^(ASSIGN ID element)
| ^(PLUS_ASSIGN ID element)
 | ^(SET setElement+)
 |  RULE_REF
| ebnf
| epsilonElement
;

epsilonElement
 : ACTION
 | SEMPRED
 | EPSILON
 | ^(ACTION elementOptions)
 | ^(SEMPRED elementOptions)
 ;

setElement
 : ^(STRING_LITERAL elementOptions)
 | ^(TOKEN_REF elementOptions)
 | STRING_LITERAL
 | TOKEN_REF
 ;

ebnf:  block
  |  ^( OPTIONAL block )
  |  ^( CLOSURE block )
  |  ^( POSITIVE_CLOSURE block )
  ;

block
  : ^(BLOCK ACTION? alternative+)
  ;

alternative
 : ^(ALT elementOptions? element+)
  ;

atom
 : ^(RULE_REF ARG_ACTION? elementOptions?)
  | ^(STRING_LITERAL elementOptions)
 | STRING_LITERAL
  | ^(TOKEN_REF elementOptions)
 | TOKEN_REF
  | ^(WILDCARD elementOptions)
 | WILDCARD
 | ^(DOT ID element)
```

;

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/parse/LeftRecursiveRuleWalker.g
No license file was found, but licenses were detected in source scan.

```
javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than a primitive type is an object
]
```

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.misc.*;
import org.antlr.v4.runtime.tree.*;
import java.util.List;
import java.util.Iterator;
import java.util.ArrayList;

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeListener;

/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
public interface <file.grammarName>Listener extends ParseTreeListener {
  <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 * @param ctx the parse tree
 */
void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the {@code <lname>\}
```

```
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>

import org.antlr.v4.runtime.ParserRuleContext;
import org.antlr.v4.runtime.tree.ErrorNode;
import org.antlr.v4.runtime.tree.TerminalNode;

/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
public class <file.grammarName>BaseListener implements <file.grammarName>Listener {
 <file.listenerNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}}; 
separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void enterEveryRule(ParserRuleContext ctx) { }
```

```
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void exitEveryRule(ParserRuleContext ctx) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitTerminal(TerminalNode node) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitErrorNode(ErrorNode node) { }
}
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeVisitor;

/**
 * This interface defines a complete generic visitor for a parse tree produced
 * by {@link <file.parserName>}.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
public interface <file.grammarName>Visitor\<T> extends ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
 * Visit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
 * Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 * @param ctx the parse tree
 * @return the visitor result
 */
```

```
T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.AbstractParseTreeVisitor;

/**
 * This class provides an empty implementation of {@link <file.grammarName>Visitor},
 * which can be extended to create a visitor which only needs to handle a subset
 * of the available methods.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
public class <file.grammarName>BaseVisitor\<T> extends AbstractParseTreeVisitor\<T> implements
<file.grammarName>Visitor\<T> {
 <file.visitorNames:{lname |
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation returns the result of calling
 * {@link #visitChildren\} on {@code ctx\}.\</p>
 */
@Override public T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { return
visitChildren(ctx); \}}; separator="\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <parser.name> extends <superClass; null="Parser"> {
 static { RuntimeMetaData.checkVersion("<file.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
```

```
protected static final PredictionContextCache _sharedContextCache =
 new PredictionContextCache();
<if(parser.tokens)>
public static final int
 <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
<endif>
public static final int
 <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
public static final String[] ruleNames = {
 <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<vocabulary(parser.literalNames, parser.symbolicNames)>

@Override
public String getGrammarFileName() { return "<parser.grammarFileName; format="java-escape">"; }

@Override
public String[] getRuleNames() { return ruleNames; }

@Override
public String getSerializedATN() { return _serializedATN; }

@Override
public ATN getATN() { return _ATN; }

<namedActions.members>
<parser:(ctor)()>
<funcs; separator="\n">

<if(sempredFuncs)>
 public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
   <parser.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static final String[] _LITERAL_NAMES = {
```

```
<literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static final String[] _SYMBOLIC_NAMES = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static final Vocabulary VOCABULARY = new VocabularyImpl(_LITERAL_NAMES,
_SYMBOLIC_NAMES);

/**
 * @deprecated Use {@link #VOCABULARY} instead.
 */
@Deprecated
public static final String[] tokenNames;
static {
 tokenNames = new String[_SYMBOLIC_NAMES.length];
 for (int i = 0; i \< tokenNames.length; i++) {
  tokenNames[i] = VOCABULARY.getLiteralName(i);
  if (tokenNames[i] == null) {
   tokenNames[i] = VOCABULARY.getSymbolicName(i);
  }

  if (tokenNames[i] == null) {
   tokenNames[i] = "\<INVALID>";
  }
 }
}

@Override
@Deprecated
public String[] getTokenNames() {
 return tokenNames;
}

@Override

public Vocabulary getVocabulary() {
 return VOCABULARY;
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
@Override
public void action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((<f.ctxType>)_localctx, actionIndex);
```

```
    break;}; separator="\n">
 }
 }
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
@Override
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
 }
<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
public <p.name>(TokenStream input) {
 super(input);
 _interp = new ParserATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 }
 }
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private boolean <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>:
```

```
 return <actions.(index)>;}; separator="\n">
 }
 return true;
 }
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=",">) throws RecognitionException {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>);
 enterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
 _localctx.exception = re;
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
 }
 <endif>
 finally {
 <finallyAction>
 exitRule();
 }
 return _localctx;
 }
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<
```

```
<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=", ">) throws RecognitionException {
 return <currentRule.name>(0<currentRule.args:{a | , <a.name>}>);
}

private <currentRule.ctxType> <currentRule.name>(int _p<args:{a | , <a>}>) throws RecognitionException {
 ParserRuleContext _parentctx = _ctx;
 int _parentState = getState();
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
 _localctx.exception = re;
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
 }
 finally {
 <finallyAction>
 unrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
```

```
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
```

```
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 <iteration>
 }
 >>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 <iteration>
 } while ( <loopExpr> );
 >>


// LL(*) stuff


AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
_alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
```

```
while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
}
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)
```

```
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>match(<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }>_input.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = (Token)}><endif>_errHandler.recoverInline(this);
}
else {
 if ( _input.LA(1)==Token.EOF ) matchedEOF = true;
 _errHandler.reportMatch(this);
 consume();
}
```

```
>>

Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>);
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip();"
LexerMoreCommand()  ::= "more();"
LexerPopModeCommand() ::= "popMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>;"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>;"
```

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getText():null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getType():0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getLine():0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getCharPositionInLine():0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getChannel():0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getTokenIndex():0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label>!=null?Integer.valueOf(<ctx(t)>.<t.label>.getText()):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.start):null)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_text(r) ::=
"(<ctx(r)>.<r.label>!=null?_input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r) ::= "_localctx.stop"
ThisRulePropertyRef_text(r) ::= "_input.getText(_localctx.start, _input.LT(-1))"
ThisRulePropertyRef_ctx(r) ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s) ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <t.name>"
TokenTypeDecl(t) ::= "int <t.name>;"
TokenListDecl(t) ::= "List\<Token> <t.name> = new ArrayList\<Token>()"
RuleContextDecl(r) ::= "<r.ctxName> <r.name>"
RuleContextListDecl(rdecl) ::= "List\<<rdecl.ctxName>> <rdecl.name> = new ArrayList\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)   ::=
  "public TerminalNode <t.name>() { return getToken(<parser.name>.<t.name>, 0); }"
ContextTokenListGetterDecl(t) ::=
  "public List\<TerminalNode> <t.name>() { return getTokens(<parser.name>.<t.name>); }"
ContextTokenListIndexedGetterDecl(t) ::= <<
public TerminalNode <t.name>(int i) {
 return getToken(<parser.name>.<t.name>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>() {
 return getRuleContext(<r.ctxName>.class,0);

```
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public List\<<r.ctxName>\> <r.name>() {
 return getRuleContexts(<r.ctxName>.class);
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>(int i) {
 return getRuleContext(<r.ctxName>.class,i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)     ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = _input.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = _input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers)
 ::= <<
public static class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) { super(parent, invokingState);
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>) {
  super(parent, invokingState);
  <struct.ctorAttrs:{a | this.<a.name> = <a.name>;}; separator="\n">
 }
 @Override public int getRuleIndex() { return RULE_<struct.derivedFromName>; }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public void copyFrom(<struct.name> ctx) {
  super.copyFrom(ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
 }
```

```
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
 }
 >>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public static class <struct.name> extends <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context ctx) { copyFrom(ctx); }
 <dispatchMethods; separator="\n">
 }
 >>


ListenerDispatchMethod(method) ::= <<
@Override
public void <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener listener) {
 if ( listener instanceof <parser.grammarName>Listener )
((<parser.grammarName>Listener)listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(this);
 }
 >>


VisitorDispatchMethod(method) ::= <<
@Override
public \<T> T accept(ParseTreeVisitor\<? extends T> visitor) {
 if ( visitor instanceof <parser.grammarName>Visitor ) return ((<parser.grammarName>Visitor\<? extends
T>)visitor).visit<struct.derivedFromName; format="cap">(this);
 else return visitor.visitChildren(this);
 }
 >>


AttributeDecl(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"


/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>((<x.ctx.name>)_localctx).<endif><x.name>"


/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "((<actionChunk.ctx.name>)_localctx)"


// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()              ::= "_ctx.stop = _input.LT(-1);"


recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
```

```
<if(label)>
<if(isListLabel)>
_localctx.<label>.add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
_ctx = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( _parseListeners!=null ) triggerExitRuleEvent();
_prevctx = _localctx;
>>

LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
package <lexerFile.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.Lexer;
import org.antlr.v4.runtime.CharStream;
import org.antlr.v4.runtime.Token;
import org.antlr.v4.runtime.TokenStream;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.atn.*;
```

```
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.misc.*;

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <lexer.name> extends <superClass; null="Lexer"> {
  static { RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION); }

  protected static final DFA[] _decisionToDFA;
  protected static final PredictionContextCache _sharedContextCache =
    new PredictionContextCache();
  public static final int
    <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
  <if(lexer.channels)>
  public static final int
    <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
  <endif>
  <rest(lexer.modes):{m| public static final int <m> = <i>;}; separator="\n">
  public static String[] modeNames = {
    <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
  };

  public static final String[] ruleNames = {
    <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
  };

  <vocabulary(lexer.literalNames, lexer.symbolicNames)>

  <namedActions.members>

  public <lexer.name>(CharStream input) {
    super(input);
    _interp = new LexerATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
  }

  @Override
  public String getGrammarFileName() { return "<lexer.grammarFileName>"; }

  @Override
  public String[] getRuleNames() { return ruleNames; }

  @Override
  public String getSerializedATN() { return _serializedATN; }

  @Override
```

```
 public String[] getModeNames() { return modeNames; }

 @Override
 public ATN getATN() { return _ATN; }

 <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
 <atn>
 }
 >>


SerializedATN(model) ::= <<
<if(rest(model.segments))>
<! requires segmented representation !>
private static final int _serializedATNSegments = <length(model.segments)>;
<model.segments:{segment|private static final String _serializedATNSegment<i0> =
 "<segment; wrap={"+<\n><\t>"}>";}; separator="\n">
public static final String _serializedATN = Utils.join(
 new String[] {
  <model.segments:{segment | _serializedATNSegment<i0>}; separator=",\n">
 },
 ""
);
<else>
<! only one segment, can be inlined !>
public static final String _serializedATN =
 "<model.serialized; wrap={"+<\n><\t>"}>";
<endif>
public static final ATN _ATN =
 new ATNDeserializer().deserialize(_serializedATN.toCharArray());
static {
 _decisionToDFA = new DFA[_ATN.getNumberOfDecisions()];
 for (int i = 0; i \< _ATN.getNumberOfDecisions(); i++) {
  _decisionToDFA[i] = new DFA(_ATN.getDecisionState(i), i);
 }
<! org.antlr.v4.tool.DOTGenerator dot = new org.antlr.v4.tool.DOTGenerator(null);!>
<! System.out.println(dot.getDOT(_ATN.decisionToState.get(0), ruleNames, false));!>
<! System.out.println(dot.getDOT(_ATN.ruleToStartState[2], ruleNames, false));!>
}
 >>


/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
 >>


codeFileExtension() ::= ".java"
```

Found in path(s):

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/codegen/Java/Java.stg

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```
tree grammar ATNBuilder;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
// filter       = true;
}

// Include the copyright in this source and also the generated source
@header {
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```
*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import org.antlr.v4.automata.ATNFactory;
}

@members {
  ATNFactory factory;
  public ATNBuilder(TreeNodeStream input, ATNFactory factory) {
   this(input);
   this.factory = factory;
  }
}

dummy : block[null] ; // avoid error about no start rule

ruleBlock[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {
  List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();
  int alt = 1;
  factory.setCurrentOuterAlt(alt);
}
  : ^(BLOCK
      (^(OPTIONS .*))?
      (   a=alternative
          {alts.add($a.p); factory.setCurrentOuterAlt(++alt);}
      )+
    )
  {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;

block[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();}
  : ^(BLOCK (^(OPTIONS .*))? (a=alternative {alts.add($a.p);})+)
   {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;

alternative returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> els = new ArrayList<ATNFactory.Handle>();}
  : ^(LEXER_ALT_ACTION a=alternative lexerCommands)
     {$p = factory.lexerAltCommands($a.p,$lexerCommands.p);}
```

```
  | ^(ALT elementOptions? EPSILON)      {$p = factory.epsilon($EPSILON);}
  |  ^(ALT elementOptions? (e=element {els.add($e.p);})+) {$p = factory.alt(els);}
  ;

lexerCommands returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> cmds = new ArrayList<ATNFactory.Handle>();}
  : (c=lexerCommand {if ($c.cmd != null) cmds.add($c.cmd);})+
    {
    $p = factory.alt(cmds);
    }
  ;

lexerCommand returns [ATNFactory.Handle cmd]
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
    {$cmd = factory.lexerCallCommand($ID, $lexerCommandExpr.start);}
| ID
    {$cmd = factory.lexerCommand($ID);}
 ;

lexerCommandExpr
 : ID
 | INT
 ;

element returns [ATNFactory.Handle p]
 : labeledElement    {$p = $labeledElement.p;}
 | atom      {$p = $atom.p;}
 | subrule     {$p = $subrule.p;}
 |  ACTION     {$p = factory.action((ActionAST)$ACTION);}
 |  SEMPRED     {$p = factory.sempred((PredAST)$SEMPRED);}
 |  ^(ACTION .)    {$p = factory.action((ActionAST)$ACTION);}
 |  ^(SEMPRED .)    {$p = factory.sempred((PredAST)$SEMPRED);}
  | ^(NOT b=blockSet[true])  {$p = $b.p;}
  | LEXER_CHAR_SET     {$p = factory.charSetLiteral($start);}
 ;

astOperand returns [ATNFactory.Handle p]
 : atom      {$p = $atom.p;}
 | ^(NOT blockSet[true])  {$p = $blockSet.p;}
 ;

labeledElement returns [ATNFactory.Handle p]
 : ^(ASSIGN ID element)    {$p = factory.label($element.p);}
 | ^(PLUS_ASSIGN ID element)   {$p = factory.listLabel($element.p);}
 ;

subrule returns [ATNFactory.Handle p]
 : ^(OPTIONAL block[$start])   {$p = $block.p;}
```

```
| ^(CLOSURE block[$start])   {$p = $block.p;}
| ^(POSITIVE_CLOSURE block[$start]) {$p = $block.p;}
| block[null]       {$p = $block.p;}
 ;


blockSet[boolean invert] returns [ATNFactory.Handle p]
@init {List<GrammarAST> alts = new ArrayList<GrammarAST>();}
 : ^(SET (setElement {alts.add($setElement.start);})+) {$p = factory.set($start, alts, $invert);}
 ;


/** Don't combine with atom otherwise it will build spurious ATN nodes */
setElement
 : ^(STRING_LITERAL .)
 | ^(TOKEN_REF .)
 | STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  |  LEXER_CHAR_SET
 ;


atom returns [ATNFactory.Handle p]
 : range     {$p = $range.p;}
 | ^(DOT ID terminal)  {$p = $terminal.p;}
 | ^(DOT ID ruleref)  {$p = $ruleref.p;}
  | ^(WILDCARD .)   {$p = factory.wildcard($start);}
  | WILDCARD    {$p = factory.wildcard($start);}
  | blockSet[false]  {$p = $blockSet.p;}
  |  terminal    {$p = $terminal.p;}
  |  ruleref     {$p = $ruleref.p;}
  ;


ruleref returns [ATNFactory.Handle p]
  : ^(RULE_REF ARG_ACTION? ^(ELEMENT_OPTIONS .*))  {$p = factory.ruleRef($RULE_REF);}
  | ^(RULE_REF ARG_ACTION?)       {$p = factory.ruleRef($RULE_REF);}
  | RULE_REF          {$p = factory.ruleRef($RULE_REF);}
  ;


range returns [ATNFactory.Handle p]
  : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL) {$p = factory.range($a,$b);}
  ;


terminal returns [ATNFactory.Handle p]
  :  ^(STRING_LITERAL .)  {$p = factory.stringLiteral((TerminalAST)$start);}
  | STRING_LITERAL    {$p = factory.stringLiteral((TerminalAST)$start);}
  | ^(TOKEN_REF ARG_ACTION .) {$p = factory.tokenRef((TerminalAST)$start);}
  | ^(TOKEN_REF .)    {$p = factory.tokenRef((TerminalAST)$start);}
  | TOKEN_REF     {$p = factory.tokenRef((TerminalAST)$start);}
  ;
```

elementOptions

 : ^(ELEMENT_OPTIONS elementOption*)

 ;

elementOption

 : ID

 | ^(ASSIGN ID ID)

 | ^(ASSIGN ID STRING_LITERAL)

 | ^(ASSIGN ID ACTION)

 | ^(ASSIGN ID INT)

 ;

Found in path(s):

* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ATNBuilder.g

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 */

/** templates used to generate make-compatible dependencies */

/** Generate "f : x, y, z" dependencies for input
 * dependencies and generated files. in and out
 * are File objects.  For example, you can say
 * <f.canonicalPath>
 */
dependencies(grammarFileName,in,out) ::= <<
<if(in)><grammarFileName>: <in; separator=", "><endif>
<out:{f | <f> : <grammarFileName>}; separator="\n">
>>
```

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* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
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 */

lexer grammar ActionSplitter;

options { filter=true; }

@header {
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
ActionSplitterListener delegate;

public ActionSplitter(CharStream input, ActionSplitterListener delegate) {
    this(input, new RecognizerSharedState());
    this.delegate = delegate;
```

```
        }

  /** force filtering (and return tokens). triggers all above actions. */
  public List<Token> getActionTokens() {
    List<Token> chunks = new ArrayList<Token>();
    Token t = nextToken();
    while ( t.getType()!=Token.EOF ) {
      chunks.add(t);
      t = nextToken();
    }
    return chunks;
  }

  private boolean isIDStartChar(int c) {
   return c == '_' || Character.isLetter(c);
  }
}

// ignore comments right away

COMMENT
  :  '/*' ( options {greedy=false;} : . )* '*/' {delegate.text($text);}
  ;

LINE_COMMENT
  : '//' ~('\n'|'\r')* '\r'? '\n' {delegate.text($text);}
  ;

SET_NONLOCAL_ATTR
 : '$' x=ID '::' y=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
 {
 delegate.setNonLocalAttr($text, $x, $y, $expr);
 }
 ;

NONLOCAL_ATTR
 : '$' x=ID '::' y=ID {delegate.nonLocalAttr($text, $x, $y);}
 ;

QUALIFIED_ATTR
 : '$' x=ID '.' y=ID {input.LA(1)!='('}? {delegate.qualifiedAttr($text, $x, $y);}
 ;

SET_ATTR
 : '$' x=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
 {
 delegate.setAttr($text, $x, $expr);
 }
```

```
  ;

ATTR
 : '$' x=ID {delegate.attr($text, $x);}
 ;

// Anything else is just random text
TEXT
@init {StringBuilder buf = new StringBuilder();}
@after {delegate.text(buf.toString());}
 : ( c=~('\\'| '$') {buf.append((char)$c);}
  | '\\$' {buf.append('$');}
  | '\\' c=~('$') {buf.append('\\').append((char)$c);}
  | {!isIDStartChar(input.LA(2))}? => '$' {buf.append('$');}
  )+
 ;

fragment
ID  : ('a'..'z'|'A'..'Z'|'_') ('a'..'z'|'A'..'Z'|'0'..'9'|'_')*
  ;

/** Don't allow an = as first char to prevent $x == 3; kind of stuff. */
fragment
ATTR_VALUE_EXPR
 : ~'=' (~';')*
 ;

fragment
WS : (' '|'\t'|'\n'|'\r')+
 ;
```

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```

```
SwiftTypeInitMap ::= [
 "Int":"0",
 "Int64":"0",
 "Float":"0.0",
 "Double":"0.0",
 "Bool":"false",
 default:"nil" // anything other than a primitive type is an object
]
SwiftTypeMap ::= [
 "int":"Int",
 "float":"Float",
 "long":"Int64",
 "double":"Double",
 "bool":"Bool",
 "boolean":"Bool",
 default : key
]
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions,contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4


<parser>
>>
```

```
ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
public protocol <file.grammarName>Listener: ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>

import Antlr4
```

```
/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
open class <file.grammarName>BaseListener: <file.grammarName>Listener {
  public init() { \}
 <file.listenerNames:{lname |

/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
open func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
open func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}};
separator="\n">

 /**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
 open func enterEveryRule(_ ctx: ParserRuleContext) { }
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
 open func exitEveryRule(_ ctx: ParserRuleContext) { }
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
 open func visitTerminal(_ node: TerminalNode) { }
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
 open func visitErrorNode(_ node: ErrorNode) { }
```

```
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
open class <file.grammarName>Visitor\<T>: ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
 - ctx: the parse tree
- returns: the visitor result
*/
open func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) -> T{
 fatalError(#function + " must be overridden")
\}
}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
```

```
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
open class <file.grammarName>BaseVisitor\<T>: AbstractParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
open func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) -> T? { return
visitChildren(ctx \}}; separator="\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<!//@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})!>
open class <parser.name>: <superClass; null="Parser"> {

 internal static var _decisionToDFA: [DFA] = {
     var decisionToDFA = [DFA]()
     let length = <parser.name>._ATN.getNumberOfDecisions()
     for i in 0..\<length {
      <!// decisionToDFA[i] = DFA(<parser.name>._ATN.getDecisionState(i)!, i);!>
       decisionToDFA.append(DFA(<parser.name>._ATN.getDecisionState(i)!, i))
      }
      return decisionToDFA
   }()
 internal static let _sharedContextCache: PredictionContextCache = PredictionContextCache()
<if(parser.tokens)>
 public enum Tokens: Int {
  case EOF = -1, <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
 }
     <endif>
 public static let <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>
 public static let ruleNames: [String] = [
```

```
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]

<vocabulary(parser.literalNames, parser.symbolicNames)>

override
open func getGrammarFileName() -> String { return "<parser.grammarFileName; format="java-escape">" }

override
open func getRuleNames() -> [String] { return <parser.name>.ruleNames }

override
open func getSerializedATN() -> String { return <parser.name>._serializedATN }

override
open func getATN() -> ATN { return <parser.name>._ATN }

<namedActions.members>
<parser:(ctor)()>
<funcs; separator="\n">

<if(sempredFuncs)>
  override
 open func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int, _ predIndex: Int)throws -> Bool {
 switch (ruleIndex) {
 <parser.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
    default: return true
 }
 <!return true;!>
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
 public static let _serializedATN : String = <parser.name>ATN().jsonString
 public static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static let _LITERAL_NAMES: [String?] = [
 <literalNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
private static let _SYMBOLIC_NAMES: [String?] = [
 <symbolicNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
```

```
public static let VOCABULARY: Vocabulary = Vocabulary(_LITERAL_NAMES, _SYMBOLIC_NAMES)

/**
* @deprecated Use {@link #VOCABULARY} instead.
*/
//@Deprecated
public let tokenNames: [String?]? = {
  let length = _SYMBOLIC_NAMES.count
  var tokenNames = [String?](repeating: nil, count: length)
 for i in 0..\<length {
  var name = VOCABULARY.getLiteralName(i)
  if name == nil {
   name = VOCABULARY.getSymbolicName(i)
  }
  if name == nil {
   name = "\<INVALID>"
  }
  tokenNames[i] = name
 }
 return tokenNames
}()

override
<!//@Deprecated!>
open func getTokenNames() -> [String?]? {
 return tokenNames
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
override
open func action(_ _localctx: RuleContext?,  _ ruleIndex: Int, _ actionIndex: Int) throws {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((_localctx as <f.ctxType>?), actionIndex)
  }; separator="\n">
 default: break
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
override
open func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int,_  predIndex: Int) throws -> Bool{
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
```

```
case <f.ruleIndex>:
return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
default: return true
}
<!return true;!>
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<

open override func getVocabulary() -> Vocabulary {
  return <p.name>.VOCABULARY
}

public override init(_ input:TokenStream)throws {
  RuntimeMetaData.checkVersion("4.6", RuntimeMetaData.VERSION)
try super.init(input)
_interp = ParserATNSimulator(self,<p.name>._ATN,<p.name>._decisionToDFA,
<parser.name>._sharedContextCache)
}
>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private func <r.name>_action(_ _localctx: <r.ctxType>?, _ actionIndex: Int) {
switch (actionIndex) {
<actions:{index|
case <index>:
<actions.(index)>
}; separator="\n">
default: break
}
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private func <r.name>_sempred(_ _localctx: <r.ctxType>!, _ predIndex: Int) throws -> Bool {
switch (predIndex) {
<actions:{index|
  case <index>:return <actions.(index)>}; separator="\n">
    default: return true
```

```
        }
        <!return true;!>
        }
        >>

        RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
        ::= <<
        <ruleCtx>
        <altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
        @discardableResult
        <if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>open func
        <endif><currentRule.name>(<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType> {
        var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
        <a.name>}>)
        try enterRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>)
        <namedActions.init>
        <locals; separator="\n">
        defer {
            <finallyAction>
            try! exitRule()
        }
        do {
        <if(currentRule.hasLookaheadBlock)>
        var _alt:Int
        <endif>
          <code>
        <postamble; separator="\n">
          <namedActions.after>
        }
        <if(exceptions)>
        <exceptions; separator="\n">
        <else>
        catch ANTLRException.recognition(let re) {
        _localctx.exception = re
        _errHandler.reportError(self, re)
        try _errHandler.recover(self, re)
        }
        <endif>

        return _localctx
        }
        >>

        LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
        namedActions,finallyAction,postamble) ::=
        <<

        <ruleCtx>
```

```
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif> func <currentRule.name>(
<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType>  {
 return try <currentRule.name>(0<currentRule.args:{a | , <a.name>}>)
}
@discardableResult
private func <currentRule.name>(_ _p<args:{a | , <a>}>: Int) throws -> <currentRule.ctxType>  {
 let _parentctx: ParserRuleContext? = _ctx
 var _parentState: Int = getState()
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>)
 var _prevctx: <currentRule.ctxType> = _localctx
 var _startState: Int = <currentRule.startState>
 try enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p)
 <namedActions.init>
 <locals; separator="\n">
 defer {
    <finallyAction>
    try! unrollRecursionContexts(_parentctx)
  }
 do {
<if(currentRule.hasLookaheadBlock)>
 var _alt: Int
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch ANTLRException.recognition(let re) {
 _localctx.exception = re
 _errHandler.reportError(self, re)
 try _errHandler.recover(self, re)
 }

 return _localctx;
 }
>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
try enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<!//{!>
```

```
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
<!//}!>
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt | <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
```

```
setState(<choice.loopBackStateNumber>)
try _errHandler.sync(self)
<iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>) <! alt block decision !>
try _errHandler.sync(self)
<preamble; separator="\n">
repeat {
<alts; separator="\n">
setState(<choice.stateNumber>); <! loopback/exit decision !>
try _errHandler.sync(self)
<iteration>
} while (<loopExpr>)
>>


// LL(*) stuff


AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch(try getInterpreter().adaptivePredict(_input,<choice.decision>, _ctx)) {
<alts:{alt |
case <i>:
<alt>
break}; separator="\n">
default: break
}
>>


OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
<alt>
break}; separator="\n">
default: break
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>)
```

```
try _errHandler.sync(self)
_alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
while (_alt != <choice.exitAlt> && _alt != ATN.INVALID_ALT_NUMBER) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
}
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
try _errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
repeat {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
} while (_alt != <choice.exitAlt> && _alt !=  ATN.INVALID_ALT_NUMBER)
>>


Sync(s) ::= "sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw try ANTLRException.recognition(e: NoViableAltException(self))"


TestSetInline(s) ::= <<
<!<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">!>
//closure
{ () -> Bool in
    <if(rest(s.bitsets))>var<else>let<endif> testSet: Bool = <first(s.bitsets):{bits |
<if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}>
      <rest(s.bitsets):{bits | testSet = testSet || <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s,
bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator="\n">
    return testSet
}()
>>
```

```
// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
<!(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1 \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1 \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)!>
{  () -> Bool in
  <! let test: Bool = (<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>)!>
  <!var temp: Int64 =  Int64(<offsetShift(s.varName, bits.shift)>)!>
  <!temp = (temp \< 0) ? (64 + (temp % 64 )) : (temp % 64)!>
  <!let test1: Int64 = (Int64(1) \<\< temp)!>
  <!var test2: Int64 = (<first(bits.ttypes):{ttype | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)}>)!>
  <!<rest(bits.ttypes):{ttype | test2 = test2 | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)};
separator="\n">!>
  let testArray: [Int] = [<s.varName>, <bits.ttypes:{ttype |<parserName(ttype)>}; separator=",">]
  <!var test2: Int64 = Utils.testBitLeftShiftArray(testArray)!>
  return  Utils.testBitLeftShiftArray(testArray, <bits.shift>)
}()
>>

isZero ::= [
"0": true,
default: false
]
parserName(ttype) ::= <%
<parser.name>.Tokens.<ttype>.rawValue
%>
offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName> == <parser.name>.Tokens.<ttype>.rawValue}; separator=" || ">
%>

cases(ttypes) ::= <<
<trunc(ttypes): {t | case .<t>:fallthrough}  ; separator="\n">
<last(ttypes): {t | case .<t>:}  ; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>)
<if(r.labels)>
```

```
try {
  let assignmentValue = try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
  <r.labels:{l | <labelref(l)> = assignmentValue} ; separator="\n">
    }()
<else>try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)<endif>
>>


MatchToken(m) ::= <<
setState(<m.stateNumber>)
<if(m.labels)>
try {
  let assignmentValue = try match(<parser.name>.Tokens.<m.name>.rawValue)
  <m.labels:{l | <labelref(l)> = assignmentValue}  ; separator="\n">
    }()
<else>try match(<parser.name>.Tokens.<m.name>.rawValue)<endif>
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>)
<if(m.labels)><m.labels:{l | <labelref(l)> = }>try _input.LT(1)<endif>
<capture>
if (<if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>)) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>try _errHandler.recoverInline(self)<if(m.labels)> as
Token<endif>
}
else {
 _errHandler.reportMatch(self)
 try consume()
}
>>


Wildcard(w) ::= <<
setState(<w.stateNumber>)
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>try matchWildcard();
>>


// ACTION STUFF


Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"
```

```
SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>)
if (!(<chunks>)) {
   throw try ANTLRException.recognition(e:FailedPredicateException(self, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>))
}
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>


// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"


LexerTypeCommand(arg)     ::= "_type = <arg>"
LexerChannelCommand(arg)   ::= "_channel = <arg>"
LexerModeCommand(arg)     ::= "_mode = <arg>"
LexerPushModeCommand(arg)  ::= "pushMode(<arg>)"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"


TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getText()! : \"\")"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getCharPositionInLine() : 0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> != nil ? Int(<ctx(t)>.<t.label>!.getText()!) : 0)"
```

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.start?.description ?? \"\") : \"\")"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.stop?.description ?? \"\") : \"\")"
RulePropertyRef_text(r) ::= "(<ctx(r)>.<r.label> != nil ? try
_input.getText(<ctx(r)>.<r.label>!.start,<ctx(r)>.<r.label>!.stop) : \"\")"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "self"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r) ::= "_localctx.stop"
ThisRulePropertyRef_text(r) ::= "(try _input.getText(_localctx.start, try _input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s) ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "<t.name>: <SwiftTypeMap.(TokenLabelType())>!"
TokenTypeDecl(t) ::= "var <t.name>: Int = 0"
TokenListDecl(t) ::= "<t.name>: Array\<Token> = Array\<Token>()"
RuleContextDecl(r) ::= "<r.name>: <r.ctxName>!"
RuleContextListDecl(rdecl) ::= "<rdecl.name>:Array\<<rdecl.ctxName>> = Array\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)   ::=
  "open func <t.name>() -> TerminalNode? { return getToken(<parser.name>.Tokens.<t.name>.rawValue, 0) }"
ContextTokenListGetterDecl(t) ::=
  "open func <t.name>() -> Array\<TerminalNode> { return getTokens(<parser.name>.Tokens.<t.name>.rawValue)
}"
ContextTokenListIndexedGetterDecl(t) ::= <<
open func <t.name>(_ i:Int) -> TerminalNode?{
 return getToken(<parser.name>.Tokens.<t.name>.rawValue, i)
}
>>
ContextRuleGetterDecl(r)   ::= <<
open func <r.name>() -> <r.ctxName>? {
 return getRuleContext(<r.ctxName>.self,0)
}
>>
ContextRuleListGetterDecl(r) ::= <<
open func <r.name>() -> Array\<<r.ctxName>\> {
 return getRuleContexts(<r.ctxName>.self)
}
>>
ContextRuleListIndexedGetterDecl(r) ::= <<
open func <r.name>(_ i: Int) -> <r.ctxName>? {
 return getRuleContext(<r.ctxName>.self,i)

```
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = try _input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = try _input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
        superClass={ParserRuleContext}) ::= <<
open class
<struct.name>:<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>,
<interfaces; separator=", "><endif> {
 <attrs:{a | public var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <! <if(ctorAttrs)>public init(_ parent: ParserRuleContext,_ invokingState: Int) { super.init(parent, invokingState)
}<endif> !>
  <if(ctorAttrs)>
  public convenience init(_ parent: ParserRuleContext?, _ invokingState: Int<ctorAttrs:{a |, _ <a>}>) {
  self.init(parent, invokingState)
  <struct.ctorAttrs:{a | self.<a.name> = <a.name>;}; separator="\n">
  }
 <endif>
 open override func getRuleIndex() -> Int { return <parser.name>.RULE_<struct.derivedFromName> }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 <!public init() { }!>
 public  func copyFrom(_ ctx: <struct.name>) {
  super.copyFrom(ctx)
  <struct.attrs:{a | self.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public  final class <struct.name>: <currentRule.name; format="cap">Context {
```

```
<attrs:{a | public var <a>}; separator="\n">
<getters:{g | <g>}; separator="\n">
public init(_ ctx: <currentRule.name; format="cap">Context) {
 super.init()
 copyFrom(ctx)
 }
<dispatchMethods; separator="\n">
}
>>


ListenerDispatchMethod(method) ::= <<
override
open func <if(method.isEnter)>enter<else>exit<endif>Rule(_ listener: ParseTreeListener) {
 if listener is <parser.grammarName>Listener {
   (listener as!
<parser.grammarName>Listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(self)
 }
 }
>>


VisitorDispatchMethod(method) ::= <<
override
open func accept\<T>(_ visitor: ParseTreeVisitor\<T>) -> T? {
 if visitor is <parser.grammarName>Visitor {
     return (visitor as! <parser.grammarName>Visitor\<T>).visit<struct.derivedFromName; format="cap">(self)
 }else if visitor is <parser.grammarName>BaseVisitor {
    return (visitor as! <parser.grammarName>BaseVisitor\<T>).visit<struct.derivedFromName; format="cap">(self)
  }
 else {
     return visitor.visitChildren(self)
 }
 }
>>


AttributeDecl(d) ::= "<d.name>: <SwiftTypeMap.(d.type)><if(d.initValue)> = <d.initValue><else>!<endif>"


/** If we don't know location of label def x, use this template (_localctx as! <x.ctx.name> */
labelref(x) ::= "<if(!x.isLocal)>_localctx.castdown(<x.ctx.name>.self).<endif><x.name>"


/** For any action chunk, what is correctly-typed context struct ptr?    */
ctx(actionChunk) ::= "_localctx.castdown(<actionChunk.ctx.name>.self)"


// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()            ::= "_ctx!.stop = try _input.LT(-1)"
```

```
recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.append(_prevctx)
<else>
_localctx.<label> = _prevctx
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = <currentAltLabel; format="cap">Context(  <ruleName; format="cap">Context(_parentctx,
_parentState))
<if(label)>
<if(isListLabel)>
(_localctx as! <currentAltLabel; format="cap">Context).<label>.append(_prevctx)
<else>
(_localctx as! <currentAltLabel; format="cap">Context).<label> = _prevctx
<endif>
<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = <ctxName>Context(_localctx)
_ctx = _localctx
_prevctx = _localctx
>>

recRuleSetPrevCtx() ::= <<
if _parseListeners != nil {
  try triggerExitRuleEvent()
}
_prevctx = _localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
<!package <lexerFile.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4
```

```
<lexer>
>>
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
open class <lexer.name>: <superClass; null="Lexer"> {
 internal static var _decisionToDFA: [DFA] = {
      var decisionToDFA = [DFA]()
      let length = <lexer.name>._ATN.getNumberOfDecisions()
      for i in 0..\<length {
        <! decisionToDFA[i] = DFA(<lexer.name>._ATN.getDecisionState(i)!, i);!>
           decisionToDFA.append(DFA(<lexer.name>._ATN.getDecisionState(i)!, i))
      }
       return decisionToDFA
   }()

 internal static let _sharedContextCache:PredictionContextCache = PredictionContextCache()
 public static let <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>
<if(lexer.channels)>
    public let <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>
<endif>
<rest(lexer.modes):{m| public static let <m>: Int = <i>;}; separator="\n">
 public static let modeNames: [String] = [
  <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
 ]

 public static let ruleNames: [String] = [
  <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 ]

 <vocabulary(lexer.literalNames, lexer.symbolicNames)>

 <namedActions.members>
   open override func getVocabulary() -> Vocabulary {
      return <lexer.name>.VOCABULARY
   }

 public override init(_ input: CharStream) {
    RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION)
  super.init(input)
  _interp = LexerATNSimulator(self, <lexer.name>._ATN, <lexer.name>._decisionToDFA,
<lexer.name>._sharedContextCache)
 }

 override
 open func getGrammarFileName() -> String { return "<lexer.grammarFileName>" }

  override
 open func getRuleNames() -> [String] { return <lexer.name>.ruleNames }
```

```
    override
    open func getSerializedATN() -> String { return <lexer.name>._serializedATN }

    override
    open func getModeNames() -> [String] { return <lexer.name>.modeNames }

    override
    open func getATN() -> ATN { return <lexer.name>._ATN }

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
    <atn>
      public static let _serializedATN: String = <lexer.name>ATN().jsonString
    public static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
    }
>>


/** Don't need to define anything. The tool generates a XParserATN.swift file (and same for lexer)
 * which is referenced from static field _serializedATN.  This json string is passed to
 * deserializeFromJson(). Note this is not the "serialization as array of ints" that other targets
 * do. It is more or less the output of ATNPrinter which gets read back in.
 */
SerializedATN(model) ::= <<
>>


/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<SwiftTypeInitMap.(typeName)>
>>


codeFileExtension() ::= ".swift"
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/codegen/Swift/Swift.stg
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*/

```
atn(startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph ATN {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

dfa(name, startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph <name>  {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states:{s | s<s>}; separator="; ">}
>>

edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,label,target,arrowhead,transitionIndex,loopback=false) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontname="Times-Italic",
label="&epsilon;"<if(loopback)>, style="dashed"<endif>];
>>

state(state, label, name, transitions) ::= <%
<name>[fontsize=11,
  label="
    <! rest(transition) tests for decision states: these nodes have a non-empty set of transitions after the first one. !>
    <if(rest(transitions))>
      {
      <! Label on the left side of the record node. !>
      <label>
      |
      <! Named ports in order on right side of record node, no display text. !>
```

```
        {<transitions:{t|\<p<i0>>}; separator="|">}}
    <else>
        <label>
    <endif>
    "
  <if(rest(transitions))>
    , shape=record, fixedsize=false
  <else>
    , shape=circle, fixedsize=true, width=.55
  <endif>
  , peripheries=1];
%>
```

```
stopstate(name,label,actionIndex,useBox) ::= <<
<name>[fontsize=11, label="<label><if(actionIndex)>,\naction:<actionIndex><endif>",
<if(useBox)>shape=polygon,sides=4,peripheries=2,fixedsize=false<else>shape=doublecircle, fixedsize=true,
width=.6<endif>];
>>
```

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*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"

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```
tree grammar BlockSetTransformer;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
 output   = AST;
 filter   = true;
}

@header {
package org.antlr.v4.parse;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.List;
import java.util.Set;
import java.util.HashSet;
import java.util.ArrayList;
import org.antlr.v4.runtime.misc.IntervalSet;
}

@members {
public String currentRuleName;
public GrammarAST currentAlt;
public Grammar g;
public BlockSetTransformer(TreeNodeStream input, Grammar g) {
   this(input, new RecognizerSharedState());
```

```
    this.g = g;
  }
}


topdown
  : ^(RULE (id=TOKEN_REF|id=RULE_REF) {currentRuleName=$id.text;} .+)
  | setAlt
  | ebnfBlockSet
  | blockSet
  ;


setAlt
 : {inContext("RULE BLOCK")}?
  ALT {currentAlt = $start;}
 ;


// (BLOCK (ALT (+ (BLOCK (ALT INT) (ALT ID)))))
ebnfBlockSet
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ^(ebnfSuffix blockSet) -> ^(ebnfSuffix ^(BLOCK<BlockAST> ^(ALT<AltAST> blockSet)))
 ;


ebnfSuffix
@after {$tree = (GrammarAST)adaptor.dupNode($start);}
 : OPTIONAL
  | CLOSURE
   | POSITIVE_CLOSURE
 ;


blockSet
@init {
boolean inLexer = Grammar.isTokenName(currentRuleName);
}
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : {inContext("RULE")}? // top-level: rule block and > 1 alt
  ^(BLOCK ^(alt=ALT elementOptions? {((AltAST)$alt).altLabel==null}? setElement[inLexer]) ( ^(ALT
elementOptions? setElement[inLexer]) )+)
  -> ^(BLOCK<BlockAST>[$BLOCK.token] ^(ALT<AltAST>[$BLOCK.token,"ALT"] ^(SET[$BLOCK.token,
"SET"] setElement+)))
 | {!inContext("RULE")}? // if not rule block and > 1 alt
  ^(BLOCK ^(ALT elementOptions? setElement[inLexer]) ( ^(ALT elementOptions? setElement[inLexer]) )+)
  -> ^(SET[$BLOCK.token, "SET"] setElement+)
 ;
```

```
setElement[boolean inLexer]
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ( ^(a=STRING_LITERAL elementOptions) {!inLexer ||
CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  |  a=STRING_LITERAL {!inLexer || CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  | {!inLexer}?=> ^(TOKEN_REF elementOptions)
  | {!inLexer}?=>  TOKEN_REF
  | {inLexer}?=> ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   {CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1 &&
    CharSupport.getCharValueFromGrammarCharLiteral($b.getText())!=-1}?
  )
 ;

elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;

elementOption
 : ID
 | ^(ASSIGN id=ID v=ID)
 | ^(ASSIGN ID v=STRING_LITERAL)
 | ^(ASSIGN ID v=ACTION)
 | ^(ASSIGN ID v=INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1354023079_1658979475.084164/0/antlr4-4-6-sources-
jar/org/antlr/v4/parse/BlockSetTransformer.g

1.67 apache-commons-beanutils 1.9.4

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/compiler/Lex.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/tools/reflect/ClassMetaobject.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/tools/web/BadHttpRequest.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/expr/NewExpr.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/compiler/ast/Member.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/FieldInfo.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/AnnotationDefaultAttribute.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/expr/Expr.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/ClassClassPath.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/LocalVariableTypeAttribute.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/SourceFileAttribute.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/CtNewMethod.java

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jar/javassist/bytecode/AnnotationsAttribute.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/tools/reflect/CannotInvokeException.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/analysis/Executor.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/annotation/CharMemberValue.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/annotation/ByteMemberValue.java

* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/annotation/EnumMemberValue.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/annotation/MemberValue.java

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* /opt/cola/permits/1338485002_1654303119.949816/0/javassist-3-19-0-ga-sources-jar/javassist/bytecode/annotation/FloatMemberValue.java

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1.71 slf4j 1.7.25

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jar/org/slf4j/helpers/FormattingTuple.java
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1.72 rxjava 1.1.2

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core/src/main/java/org/jctools/queues/atomic/SpscUnboundedAtomicArrayQueue.java
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* Original License: https://github.com/JCTools/JCTools/blob/master/LICENSE
* Original location: https://github.com/JCTools/JCTools/blob/master/jctools-
core/src/main/java/org/jctools/queues/SpmcArrayQueue.java
*/

Found in path(s):
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/util/unsafe/SpmcArrayQueue.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkipUntil.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorMapPair.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWindowWithTime.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorBufferWithSize.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDelayWithSelector.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTakeTimed.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDistinctUntilChanged.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/schedulers/NewThreadWorker.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDoAfterTerminate.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/RxThreadFactory.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorPublish.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorOnBackpressureLatest.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkipTimed.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWindowWithStartEndObservable.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeTimerOnce.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorEagerConcatMap.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWindowWithSize.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWindowWithObservable.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeDelaySubscription.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorBufferWithSingleObservable.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeDelaySubscriptionOther.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDebounceWithTime.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeRefCount.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWindowWithObservableFactory.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/PlatformDependent.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/SynchronizedQueue.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSampleWithObservable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/RxJavaPluginUtils.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorBufferWithStartEndObservable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorMulticast.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorBufferWithTime.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/schedulers/ScheduledAction.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/FrontPadding.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSampleWithTime.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeTimerPeriodically.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSwitch.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeDelaySubscriptionWithSelector.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDistinct.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorWithLatestFrom.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/atomic/SpscLinkedArrayQueue.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorRetryWithPredicate.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/ExecutorScheduler.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDebounceWithSelector.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/TrampolineScheduler.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/observables/BlockingObservable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDoOnUnsubscribe.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subscriptions/CompositeSubscription.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDoOnSubscribe.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDoOnRequest.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeSingle.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkipLast.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorToMultimap.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subjects/SubjectSubscriptionManager.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkipLastTimed.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSwitchIfEmpty.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/CachedThreadScheduler.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action2.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/BlockingOperatorNext.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/Schedulers.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeRange.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeFromIterable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/TimeInterval.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/plugins/RxJavaObservableExecutionHook.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorToObservableSortedList.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTakeUntil.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/exceptions/OnErrorFailedException.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CompletableOnSubscribeMergeDelayErrorIterable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorUnsubscribeOn.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/schedulers/EventLoopsScheduler.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/Producer.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/package-info.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CachedObservable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorMaterialize.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkip.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CompletableOnSubscribeMergeDelayErrorArray.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/plugins/RxJavaErrorHandler.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorCast.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSkipWhile.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/BackpressureDrainManager.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorObserveOn.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action9.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/exceptions/MissingBackpressureException.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Func3.java
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jar/rx/internal/operators/BlockingOperatorMostRecent.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subscriptions/SerialSubscription.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CompletableOnSubscribeMergeIterable.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CompletableOnSubscribeMerge.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action1.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeFromArray.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/Observer.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/exceptions/OnCompletedFailedException.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTakeUntilPredicate.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorDematerialize.java

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subjects/SerializedSubject.java

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/observers/Observers.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action8.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/ImmediateScheduler.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action6.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/operators/UnicastSubject.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/observers/TestSubscriber.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subjects/ReplaySubject.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subjects/BehaviorSubject.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Func2.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action5.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/operators/BufferUntilSubscriber.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorScan.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/plugins/RxJavaPlugins.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/operators/OnSubscribeAmb.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/operators/OnSubscribeDefer.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/subscriptions/BooleanSubscription.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/operators/OperatorDoOnEach.java

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTimeoutWithSelector.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action0.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTakeLast.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorAsObservable.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorFilter.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Function.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/SubscriptionList.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/plugins/RxJavaObservableExecutionHookDefault.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeRedo.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subscriptions/MultipleAssignmentSubscription.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/schedulers/SleepingAction.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/Subscription.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/observers/Subscribers.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OnSubscribeJoin.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/FuncN.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTake.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorOnErrorResumeNextViaFunction.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/exceptions/UnsubscribeFailedException.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTimeInterval.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Func7.java

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/IndexedRingBuffer.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/subscriptions/RefCountSubscription.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Action7.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/CompletableOnSubscribeConcat.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/BlockingOperatorToIterator.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Func5.java
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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorSubscribeOn.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorTakeWhile.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/functions/Func0.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorOnBackpressureDrop.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/OperatorThrottleFirst.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/operators/BlockingOperatorLatest.java
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/exceptions/OnErrorNotImplementedException.java

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 * core/src/main/java/org/jctools/queues/SpscLinkedQueue.java
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====

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It is excluded from the public Javadocs (http://netflix.github.io/RxJava/javadoc/) and should not be relied upon by

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In short, changes to public signatures of these classes will not be accounted for in the versioning of RxJava.

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core/src/main/java/org/jctools/queues/atomic/SpscLinkedAtomicQueue.java

*/

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jar/rx/internal/operators/OnSubscribeConcatMap.java

* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-

jar/rx/internal/operators/OnSubscribePublishMulticast.java

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core/src/main/java/org/jctools/queues/atomic/AtomicReferenceArrayQueue.java

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jar/rx/internal/util/atomic/SpscAtomicArrayQueue.java

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jar/rx/internal/util/atomic/SpscExactAtomicArrayQueue.java

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/**

* This plugin class provides 2 ways to customize {@link Scheduler} functionality

* 1. You may redefine entire schedulers, if you so choose. To do so, override

* the 3 methods that return Scheduler (io(), computation(), newThread()).

* 2. You may wrap/decorate an {@link Action0}, before it is handed off to a Scheduler. The system-

* supplied Schedulers (Schedulers.ioScheduler, Schedulers.computationScheduler,

* Scheduler.newThreadScheduler) all use this hook, so it's a convenient way to

* modify Scheduler functionality without redefining Schedulers wholesale.

*

* Also, when redefining Schedulers, you are free to use/not use the onSchedule decoration hook.

* <p>

* See {@link RxJavaPlugins} or the RxJava GitHub Wiki for information on configuring plugins:

* <a

href="https://github.com/ReactiveX/RxJava/wiki/Plugins">https://github.com/ReactiveX/RxJava/wiki/Plugins.

*/

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/plugins/RxJavaSchedulersHook.java

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This package contains code that relies on sun.misc.Unsafe. Before using it you MUST assert
UnsafeAccess.isUnsafeAvailable() == true

Much of the code in this package comes from or is inspired by the JCTools project:
https://github.com/JCTools/JCTools

JCTools has now published artifacts (https://github.com/JCTools/JCTools/issues/17) so RxJava could add JCTools
as a "shadow" dependency (https://github.com/ReactiveX/RxJava/issues/1735).

RxJava has a "zero dependency" policy for the core library, so if we do add it as a dependency, it won't be an externally visible dependency that results in a separate jar.

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* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-
jar/rx/internal/util/unsafe/MpscLinkedQueue.java
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```

* Original location: https://github.com/JCTools/JCTools/blob/master/jctools-
core/src/main/java/org/jctools/queues/MessagePassingQueue.java
*/

Found in path(s):
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*/

Found in path(s):
* /opt/cola/permits/1274704083_1645234944.44/0/rxjava-1-1-2-sources-jar/rx/internal/util/ObjectPool.java

1.73 geb-waiting 0.9.2

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Found in path(s):

* /opt/cola/permits/1354022299_1656537267.1779182/0/geb-waiting-0-9-2-sources-jar/geb/error/GebException.java

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* /opt/cola/permits/1354022299_1656537267.1779182/0/geb-waiting-0-9-2-sources-jar/geb/waiting/UnknownWaitForEvaluationResult.groovy

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* /opt/cola/permits/1354022299_1656537267.1779182/0/geb-waiting-0-9-2-sources-jar/geb/waiting/Wait.groovy

* /opt/cola/permits/1354022299_1656537267.1779182/0/geb-waiting-0-9-2-sources-

jar/geb/waiting/WaitTimeoutException.java

1.74 profiler 1.0.2

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1.76 jackson-annotations 2.10.2

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1.77 pact-jvm-matchers_2.12 3.5.17

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1.78 dropwizard-hibernate-support 1.3.2

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1.80 findbugs-jsr305 3.0.2

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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

The Stempel analyzer (stempel) includes BSD-licensed software developed
by the Egothor project http://egothor.sf.net/, created by Leo Galambos, Martin Kvapil,
and Edmond Nolan.

The Polish analyzer (stempel) comes with a default
stopword list that is BSD-licensed created by the Carrot2 project. The file resides
in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt.
See https://github.com/carrot2/carrot2.

The SmartChineseAnalyzer source code (smartcn) was
provided by Xiaoping Gao and copyright 2009 by www.imdict.net.

WordBreakTestUnicode_*.java (under modules/analysis/common/src/test/)
is derived from Unicode data such as the Unicode Character Database.
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The Morfologik analyzer (morfologik) includes BSD-licensed software
developed by Dawid Weiss and Marcin Mikowski
(https://github.com/morfologik/morfologik-stemming) and uses
data from the BSD-licensed dictionary of Polish (SGJP, http://sgjp.pl/morfeusz/).

Servlet-api.jar and javax.servlet-*.jar are under the CDDL license, the original
source code for this can be found at http://www.eclipse.org/jetty/downloads.php

==
Kuromoji Japanese Morphological Analyzer - Apache Lucene Integration
==

This software includes a binary and/or source version of data from

 mecab-ipadic-2.7.0-20070801

which can be obtained from

 http://atilika.com/releases/mecab-ipadic/mecab-ipadic-2.7.0-20070801.tar.gz

or

 http://jaist.dl.sourceforge.net/project/mecab/mecab-ipadic/2.7.0-20070801/mecab-ipadic-2.7.0-20070801.tar.gz

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==
Nori Korean Morphological Analyzer - Apache Lucene Integration
==

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 mecab-ko-dic-2.0.3-20170922

which can be obtained from

 https://bitbucket.org/eunjeon/mecab-ko-dic/downloads/mecab-ko-dic-2.0.3-20170922.tar.gz

The floating point precision conversion in NumericUtils.Float16Converter is derived from work by Jeroen van der Zijp, granted for use under the Apache license.

1.82 okhttp-logging-interceptor 3.8.0
1.82.1 Available under license :

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* /opt/cola/permits/1354022941_1658978619.0105996/0/logging-interceptor-3-8-0-sources-1-jar/okhttp3/logging/HttpLoggingInterceptor.java

1.83 annotations-for-metrics 4.0.5
1.83.1 Available under license :

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Manifest-Version: 1.0
Bnd-LastModified: 1545937828713
Build-Jdk: 1.8.0_191
Built-By: artem
Bundle-Description: A dependency-less package of just the annotations

used by other Metrics modules.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Annotations for Metrics

Bundle-SymbolicName: io.dropwizard.metrics.annotation

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.annotation;version="4.0.5"

Implementation-Title: Annotations for Metrics

Implementation-URL: http://metrics.dropwizard.io/metrics-annotation

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274702882_1649016487.79/0/metrics-annotation-4-0-5-jar/META-INF/MANIFEST.MF

1.84 powermock-api-mockito2 2.0.0

1.84.1 Available under license :

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```
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 */
```

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* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/configuration/PowerMockitoSpyAnnotationEngine.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/configuration/PowerMockitoInjectingAnnotationEngine.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/PowerMockito.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/PowerMockitoStubber.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/invocation/MockitoMethodInvocationControl.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/verification/WithVerifiedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/mockpolicies/Slf4jMockPolicy.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/expectation/DefaultMethodExpectationSetup.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/verification/ConstructorArgumentsVerification.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/reporter/MockitoPowerMockReporter.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/verification/DefaultConstructorArgumentsVerification.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/PrivatelyExpectedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/powermocklistener/AnnotationEnabler.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/extension/listener/AnnotationEnabler.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/exceptions/StackTraceCleanerProvider.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/verification/DefaultPrivateMethodVerification.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/expectation/PowerMockitoStubberImpl.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/ConstructorAwareExpectationSetup.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/verification/WithOrWithoutVerifiedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/verification/WithoutVerifiedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/WithoutExpectedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/PowerMockitoCore.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/verification/PrivateMethodVerification.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/mockcreation/DefaultMockCreator.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/expectation/WithExpectedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/mockmaker/PowerMockMaker.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-
jar/org/powermock/api/mockito/internal/verification/VerifyNoMoreInteractions.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/internal/expectation/DefaultPrivatelyExpectedArguments.java
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* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/internal/expectation/DelegatingToConstructorsOngoingStubbing.java
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* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/internal/stubbing/PowerMockCallRealMethod.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/invocation/MockHandlerAdaptor.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/invocation/InvocationFactory.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/expectation/DefaultConstructorExpectationSetup.java

* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/mockmaker/MockMakerLoader.java

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* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/expectation/WithExpectedParameterTypes.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/internal/invocation/MockitoNewInvocationControl.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/expectation/WithOrWithoutExpectedArguments.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/internal/invocation/InvocationControlAssertionError.java
* /opt/cola/permits/1354023229_1656537191.1716347/0/powermock-api-mockito2-2-0-0-sources-2-jar/org/powermock/api/mockito/expectation/WithAnyArguments.java

1.85 hibernate-validator 5.4.3.Final

1.85.1 Available under license :

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/**
 * Retrieves constraint related meta data for the parameters of the given
 * executable.
 *
 * @param executable The executable of interest.
 *
 * @return A list with parameter meta data for the given executable.
 */

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* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/provider/AnnotationMetaDataProvider.java
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jar/org/hibernate/validator/internal/constraintvalidators/hv/pl/PolishNumberValidator.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/raw/ConstrainedField.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/DecimalMinValidatorForCharSequence.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/past/PastValidatorForInstant.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/cfg/defs/LengthDef.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/util/privilegedactions/GetDeclaredMethods.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/aggregated/ExecutableMetaData.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/engine/messageinterpolation/parser/ELState.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/util/privilegedactions/GetDeclaredFields.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/cfg/defs/PatternDef.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/facets/Validatable.java

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/constraints/ModCheck.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/engine/messageinterpolation/el/MapBasedVariableMapper.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/MinValidatorForCharSequence.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/hv/br/CPFValidator.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/engine/valuehandling/package-info.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/DecimalMaxValidatorForCharSequence.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/past/PastValidatorForDate.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/raw/ConstrainedType.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/metadata/aggregated/rule/ParallelMethodsMustNotDefineParameterConstraints.j
ava
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/engine/messageinterpolation/el/MapBasedFunctionMapper.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/money/DecimalMaxValidatorForMonetaryAmount.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/cfg/defs/NotBlankDef.java
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
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/*
* Hibernate Validator, declare and validate application constraints
*
* License: Apache License, Version 2.0
* See the license.txt file in the root directory or <http://www.apache.org/licenses/LICENSE-2.0>.
*/
/*
* Written by Doug Lea with assistance from members of JCP JSR-166
* Expert Group and released to the public domain, as explained at
* http://creativecommons.org/licenses/publicdomain
*/

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jar/org/hibernate/validator/internal/util/ConcurrentReferenceHashMap.java
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*/
/**
* <p>
* A method-level constraint, that evaluates a script expression against the
* annotated method or constructor. This constraint can be used to implement
* validation routines that depend on several parameters of the annotated
* executable.
* </p>
* <p>
* Script expressions can be written in any scripting or expression language,
* for which a JSR 223
* ("Scripting for the Java^{TM} Platform") compatible engine can be
* found on the classpath. To refer to a parameter within the scripting
* expression, use its name as obtained by the active
* {@link javax.validation.ParameterNameProvider}. By default, {@code arg0}, {@code arg1} etc.
* will be used as parameter names.
* </p>
* <p>
* The following listing shows an example using the JavaScript engine which
* comes with the JDK:
* </p>
* <pre>
* {@code @ParameterScriptAssert(script = "arg0.before(arg1)", lang = "javascript")
* public void createEvent(Date start, Date end) { ... }

* }
* </pre>
* <p>
* Can be specified on any method or constructor.
* </p>
*
* @author Gunnar Morling
*/

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jar/org/hibernate/validator/constraints/ParameterScriptAssert.java
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 ~
 ~ License: Apache License, Version 2.0
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jar/org/hibernate/validator/overview.html
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* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/engine/resolver/package.html
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/util/classhierarchy/package.html
* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-
jar/org/hibernate/validator/internal/util/annotationfactory/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/constraints/br/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/META-INF/validation-configuration-1.1.xsd

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/descriptor/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/xml/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/cfg/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/util/privilegedactions/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/util/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/cfg/defs/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/provider/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/constraints/pl/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/messageinterpolation/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/facets/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/messageinterpolation/el/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/groups/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/constraintvalidation/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/META-INF/validation-mapping-1.1.xsd

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/META-INF/validation-mapping-1.0.xsd

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/aggregated/rule/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/spi/resourceloading/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/path/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/raw/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/constraintvalidation/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/META-INF/maven/org.hibernate/hibernate-validator/pom.xml

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/group/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/cfg/defs/br/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/cfg/context/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/resourceloading/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/cfg/defs/pl/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/metadata/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/engine/messageinterpolation/package.html

* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/util/scriptengine/package.html

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* /opt/cola/permits/1097547518_1602103936.56/0/hibernate-validator-5-4-3-final-sources-3-jar/org/hibernate/validator/internal/util/TypeHelper.java

1.86 c3p0jdbcdatasources 0.9.5.4

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1.87 elasticsearch-lz4 8.4.3

1.88 simpleclient-servlet 0.5.0

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1.89 jackson-core 2.10.3

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Jackson JSON processor

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It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has
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It is currently developed by a community of developers, as well as supported
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1.90 metrics-health-checks 4.0.5

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1.91 java-diff-utils 1.3.0

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Found in path(s):
* /opt/cola/permits/1131003422_1649015566.9/0/diffutils-1-3-0-jar/META-INF/maven/com.googlecode.java-diff-utils/diffutils/pom.xml
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Manifest-Version: 1.0
Archiver-Version: Plexus Archiver
Built-By: smitterm
Created-By: Apache Maven Bundle Plugin
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bnd-LastModified: 1362404972142
Export-Package: difflib;uses:="difflib.myers";version="1.3.0",difflib.
myers;uses:=difflib;version="1.3.0"
Bundle-Version: 1.3.0
Bundle-Description: The DiffUtils library for computing diffs, applyin
g patches, generationg side-by-side view in Java.
Bundle-Name: java-diff-utils
Build-Jdk: 1.5.0_22
Bundle-ManifestVersion: 2
Bundle-SymbolicName: com.googlecode.java-diff-utils.diffutils
Tool: Bnd-1.50.0

Found in path(s):
* /opt/cola/permits/1131003422_1649015566.9/0/diffutils-1-3-0-jar/META-INF/MANIFEST.MF

1.92 geb-core 0.9.2

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/** A very fast and memory efficient class to encode and decode to and from BASE64 in full accordance
* with RFC 2045.

* On Windows XP sp1 with 1.4.2_04 and later ;), this encoder and decoder is about 10 times faster
* on small arrays (10 - 1000 bytes) and 2-3 times as fast on larger arrays (10000 - 1000000 bytes)
* compared to <code>sun.misc.Encoder()/Decoder()</code>.

*
* On byte arrays the encoder is about 20% faster than Jakarta Commons Base64 Codec for encode and
* about 50% faster for decoding large arrays. This implementation is about twice as fast on very small
* arrays (&lt 30 bytes). If source/destination is a <code>String</code> this
* version is about three times as fast due to the fact that the Commons Codec result has to be recoded
* to a <code>String</code> from <code>byte[]</code>, which is very expensive.

*
* This encode/decode algorithm doesn't create any temporary arrays as many other codecs do, it only
* allocates the resulting array. This produces less garbage and it is possible to handle arrays twice
* as large as algorithms that create a temporary array. (E.g. Jakarta Commons Codec). It is unknown
* whether Sun's <code>sun.misc.Encoder()/Decoder()</code> produce temporary arrays but since performance
* is quite low it probably does.

*
* The encoder produces the same output as the Sun one except that the Sun's encoder appends
* a trailing line separator if the last character isn't a pad. Unclear why but it only adds to the
* length and is probably a side effect. Both are in conformance with RFC 2045 though.
* Commons codec seem to always att a trailing line separator.

*
* Note!
* The encode/decode method pairs (types) come in three versions with the exact same algorithm and
* thus a lot of code redundancy. This is to not create any temporary arrays for transcoding to/from different
* format types. The methods not used can simply be commented out.

*
* There is also a "fast" version of all decode methods that works the same way as the normal ones, but
* har a few demands on the decoded input. Normally though, these fast verions should be used if the source if
* the input is known and it hasn't bee tampered with.

*
* If you find the code useful or you find a bug, please send me a note at base64 @ miginfocom . com.
*
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* ==============
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*
* @version 2.2
* @author Mikael Grev
*   Date: 2004-aug-02
*   Time: 11:31:11
*/

Found in path(s):
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/Base64.java
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* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/BuildAdapter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/ConfigurationLoader.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/driver/DriverRegistry.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/binding/BindingUpdater.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/download/DownloadSupport.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/buildadapter/SystemPropertiesBuildAdapter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/textmatching/NegatedTextMatcher.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/textmatching/TextMatcher.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/textmatching/PatternTextMatcher.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/buildadapter/BuildAdapterFactory.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/download/DownloadException.java

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* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/NoBaseUrlDefinedException.java

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/navigator/SelectFactory.groovy

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```
/*
```

Found in path(s):
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/AbstractNavigator.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/Navigator.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/error/NoNewWindowException.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/AbstractNavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/NavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/report/ExceptionToPngConverter.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/error/InvalidGebConfiguration.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/InnerNavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/ClosureInnerNavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/NavigatorBackedNavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/content/PageContentTemplateParams.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/DefaultInnerNavigatorFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/navigator/factory/BrowserBackedNavigatorFactory.groovy
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jar/geb/driver/DefaultDriverFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/driver/NameBasedDriverFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/driver/DriverCreationException.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/driver/CachingDriverFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/error/UnknownDriverShortNameException.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/error/UnableToLoadAnyDriversException.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-
jar/geb/driver/CallbackDriverFactory.groovy
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* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/InvalidPageContent.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/js/JQueryAdapter.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/SimplePageContent.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/PageContentTemplateBuilder.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/PageContentTemplateFactoryDelegate.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/Configuration.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/js/JavascriptInterface.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/waiting/WaitingSupport.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/UnexpectedPageException.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/GebAssertionError.java
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/PageContentTemplate.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/driver/DriverFactory.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/PageContent.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/TemplateDerivedPageContent.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/js/AlertAndConfirmSupport.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/Browser.groovy
* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/Navigable.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/PageSourceReporter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/RequiredPageValueNotPresent.java

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/Reporter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/CompositeReporter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/PageChangeListener.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/ScreenshotReporter.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/textmatching/TextMatchingSupport.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/PageChangeListenerAlreadyRegisteredException.java

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/ModuleBaseCalculator.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/UnresolvablePropertyException.java

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/Page.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/ReporterSupport.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/report/PngUtils.java

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/driver/RemoteDriverOperations.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/content/ModuleBaseDefinitionDelegate.groovy

* /opt/cola/permits/1354022389_1656537277.7838047/0/geb-core-0-9-2-sources-jar/geb/error/RequiredPageContentNotPresent.java

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1.93 asm-analysis 9.1

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 * Constructs a new {@link BasicInterpreter} for the latest ASM API version. <i>Subclasses must

 * not use this constructor</i>. Instead, they must use the {@link #BasicInterpreter(int)}

 * version.

 */

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1.94 spotbugs-annotations 4.4.0

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* /opt/cola/permits/1547606348_1675074777.3435261/0/spotbugs-annotations-4-4-0-sources-1-
jar/edu/umd/cs/findbugs/annotations/When.java
* /opt/cola/permits/1547606348_1675074777.3435261/0/spotbugs-annotations-4-4-0-sources-1-
jar/edu/umd/cs/findbugs/annotations/Priority.java
* /opt/cola/permits/1547606348_1675074777.3435261/0/spotbugs-annotations-4-4-0-sources-1-
jar/edu/umd/cs/findbugs/annotations/DefaultAnnotation.java
* /opt/cola/permits/1547606348_1675074777.3435261/0/spotbugs-annotations-4-4-0-sources-1-
jar/edu/umd/cs/findbugs/annotations/Confidence.java
* /opt/cola/permits/1547606348_1675074777.3435261/0/spotbugs-annotations-4-4-0-sources-1-
jar/edu/umd/cs/findbugs/annotations/DefaultAnnotationForMethods.java
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1.95 saxon-xslt-and-xquery-processor 10.5

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1.96 zt-process-executor 1.7

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analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,

analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
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Manifest-Version: 1.0

Bnd-LastModified: 1484843099616

Build-Jdk: 1.8.0_92

Built-By: jerseyrobot

Bundle-Description: Jersey core server implementation

Bundle-DocURL: http://www.oracle.com/

Bundle-License: http://glassfish.java.net/public/CDDL+GPL_1_1.html

Bundle-ManifestVersion: 2

Bundle-Name: jersey-core-server

Bundle-SymbolicName: org.glassfish.jersey.core.jersey-server

Bundle-Vendor: Oracle Corporation

Bundle-Version: 2.25.1

Created-By: Apache Maven Bundle Plugin

Export-Package: org.glassfish.jersey.server.filter;uses:="javax.annotati
on,javax.ws.rs,javax.ws.rs.container,javax.ws.rs.core,org.glassfish.jer
sey.message.internal,org.glassfish.hk2.api,jersey.repackaged.com.google
.common.collect,org.glassfish.jersey.spi,org.glassfish.jersey.server,ja
vax.inject,org.glassfish.jersey.server.internal,org.glassfish.jersey.in
ternal.util,org.glassfish.jersey.server.model,javax.annotation.security
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fish.jersey.server.wadl.internal.generators.resourcedoc.xhtml,com.sun.r
esearch.ws.wadl,org.glassfish.jersey.server.wadl.internal,javax.inject"
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ore,com.sun.research.ws.wadl,org.glassfish.jersey.server.wadl.internal,
org.glassfish.jersey.server.model,javax.xml.bind,org.glassfish.hk2.util
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No license file was found, but licenses were detected in source scan.

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INF/maven/org.glassfish.jersey.core/jersey-server/pom.xml
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1.104 visible-assertions 2.1.0

1.104.1 Available under license :

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* /opt/cola/permits/1354022878_1656537271.4189482/0/visible-assertions-2-1-0-sources-jar/org/rnorth/visibleassertions/VisibleAssertions.java

* /opt/cola/permits/1354022878_1656537271.4189482/0/visible-assertions-2-1-0-sources-jar/org/rnorth/visibleassertions/AnsiSupport.java

1.105 elasticsearch-cli 8.4.3

1.106 commons-compress 1.6

1.106.1 Available under license :

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1.108 asm-util 9.2

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* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-jar/org/objectweb/asm/util/TraceClassVisitor.java
* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-jar/org/objectweb/asm/util/CheckAnnotationAdapter.java
* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-jar/org/objectweb/asm/util/Textifier.java
* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-jar/org/objectweb/asm/util/TraceAnnotationVisitor.java
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jar/org/objectweb/asm/util/TraceFieldVisitor.java

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jar/org/objectweb/asm/util/TraceModuleVisitor.java

* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-jar/org/objectweb/asm/util/Printer.java

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jar/org/objectweb/asm/util/TraceSignatureVisitor.java

* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-
jar/org/objectweb/asm/util/CheckClassAdapter.java

* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-
jar/org/objectweb/asm/util/TraceRecordComponentVisitor.java

* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-
jar/org/objectweb/asm/util/TraceMethodVisitor.java

* /opt/cola/permits/1288693971_1647366214.45/0/asm-util-9-2-sources-
jar/org/objectweb/asm/util/CheckRecordComponentAdapter.java

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1.109 hibernate-jpa-api 1.0.0

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMultimap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Serialization.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Collections2.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/HashBasedTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/SingletonImmutableBiMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/RegularImmutableBiMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMapEntrySet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/EmptyImmutableListMultimap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMapKeySet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/TreeBasedTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/RegularImmutableMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Table.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMultiset.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/StandardTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/UnmodifiableIterator.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMapValues.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Platform.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-

jar/com/google/common/collect/ImmutableCollection.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/thirdparty/publicsuffix/PublicSuffixPatterns.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/CollectPreconditions.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/PeekingIterator.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/Tables.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableSortedSet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/Range.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/StandardRowSortedTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableBiMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableEntry.java
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jar/com/google/common/base/JdkPattern.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/CommonPattern.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/CommonMatcher.java
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/*

/*

 * This method was rewritten in Java from an intermediate step of the Murmur hash function in

 * http://code.google.com/p/smhasher/source/browse/trunk/MurmurHash3.cpp, which contained the

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/**

 * Not supported. You are attempting to create a map that may contain a non-{@code Comparable}

 * key. Proper calls will resolve to the version in {@code ImmutableSortedMap}, not this dummy

 * version.

 *

 * @throws UnsupportedOperationException always

```
 * @deprecated <b>Pass a key of type {@code Comparable} to use {@link
 *     ImmutableSortedMap#of(Comparable, Object)}.</b>
 */
```

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 */
/**
 * Holder for web specializations of methods of {@code Floats}. Intended to be empty for regular
 * version.
 */
```

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/FloatsMethodsForWeb.java
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jar/com/google/common/graph/MutableGraph.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/io/InsecureRecursiveDeleteException.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/PredecessorsFunction.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/MutableNetwork.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/ImmutableGraph.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/Graph.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/io/RecursiveDeleteOption.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/ImmutableNetwork.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/TopKSelector.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/SuccessorsFunction.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/Network.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/graph/Graphs.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/hash/Funnel.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/PairwiseEquivalence.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/Enums.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/AbstractListeningExecutorService.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/AbstractCache.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/AbstractCompositeHashFunction.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/EmptyContiguousSet.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/PrimitiveSink.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/AbstractStreamingHasher.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/HashingOutputStream.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/CacheStats.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/Types.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/primitives/UnsignedInteger.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/RegularImmutableMultiset.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/BigIntegerMath.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/Funnels.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/HashCode.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/AbstractLoadingCache.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/Hasher.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/primitives/ParseRequest.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/Crc32cHashFunction.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/TypeParameter.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/AbstractSortedMultiset.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/primitives/UnsignedInts.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/ForwardingExecutorService.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/primitives/UnsignedLongs.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/ForwardingLoadingCache.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/DoubleMath.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/CacheLoader.java
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jar/com/google/common/primitives/UnsignedLong.java
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jar/com/google/common/util/concurrent/ForwardingCondition.java
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jar/com/google/common/primitives/ImmutableDoubleArray.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/ImmutableLongArray.java
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jar/com/google/common/util/concurrent/ForwardingLock.java
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*/
/*
 * This method was rewritten in Java from an intermediate step of the Murmur hash function in
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 */

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/SortedLists.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/TypeToken.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/UncheckedTimeoutException.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/SimpleTimeLimiter.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/GwtFluentFutureCatchingSpecialization.java
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jar/com/google/common/io/AppendableWriter.java
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*/
/**
* Holder for web specializations of methods of {@code Ints}. Intended to be empty for regular
* version.
*/

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/html/HtmlEscapers.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/SparseImmutableTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/MapMaker.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/SettableFuture.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/escape/Escapers.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/AbstractIdleService.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/xml/XmlEscapers.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/ByteArrayDataOutput.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/primitives/SignedBytes.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Cut.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/net/InternetDomainName.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/ForwardingFuture.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/ForwardingFluentFuture.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/FinalizableWeakReference.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/FinalizablePhantomReference.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/AbstractFuture.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/Function.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/LittleEndianDataInputStream.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/LineReader.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/ByteStreams.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/MinMaxPriorityQueue.java
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 * As of 2010/06/11, this method is identical to the (package private) hash method in OpenJDK 7's
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jar/com/google/common/collect/BaseImmutableMultimap.java

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jar/com/google/common/collect/JdkBackedImmutableMap.java
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*/
/**
* Holder for web specializations of methods of {@code Shorts}. Intended to be empty for regular
* version.
*/

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jar/com/google/common/primitives/ShortsMethodsForWeb.java
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jar/com/google/common/util/concurrent/CombinedFuture.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/hash/FarmHashFingerprint64.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/InterruptibleTask.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/MacHashFunction.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/AggregateFutureState.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ConsumingQueueIterator.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/Platform.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/AsyncCallable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/LittleEndianByteArray.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/ReaderInputStream.java
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/**
* Holder for web specializations of methods of {@code Doubles}. Intended to be empty for regular
* version.
*/

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jar/com/google/common/cache/Striped64.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/hash/LongAdder.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/hash/Striped64.java
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jar/com/google/common/util/concurrent/TrustedListenableFutureTask.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/eventbus/Dispatcher.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/math/Quantiles.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/MoreObjects.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/eventbus/Subscriber.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/util/concurrent/ListenerCallQueue.java
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jar/com/google/common/collect/JdkBackedImmutableSet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/util/concurrent/ExecutionSequencer.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ReverseOrdering.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ForwardingObject.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/NullsFirstOrdering.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/AbstractTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/VerifyException.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/eventbus/SubscriberExceptionContext.java
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jar/com/google/common/reflect/Reflection.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/AbstractIndexedListIterator.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/RegularImmutableSortedSet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/DiscreteDomain.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableSortedSetFauxverideShim.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-

jar/com/google/common/collect/ImmutableClassToInstanceMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableSetMultimap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableSortedMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/SingletonImmutableTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ComputationException.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/RegularImmutableList.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/SingletonImmutableList.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ComparisonChain.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/EmptyImmutableSetMultimap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ArrayTable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableEnumSet.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ImmutableAsList.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/ForwardingTable.java
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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/reflect/Element.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/reflect/ImmutableTypeToInstanceMap.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-

jar/com/google/common/io/Closer.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/PairedStats.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/RateLimiter.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/LinearTransformation.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/FileWriteMode.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/Invokable.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/LongAddables.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/BaseEncoding.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/ListenableScheduledFuture.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/cache/LongAddable.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/Parameter.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/escape/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableRangeSet.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableRangeMap.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/AbstractInvocationHandler.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/CartesianList.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/MutableTypeToInstanceMap.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/html/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/LongAddable.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/ClassPath.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/LongAddables.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/ByteSource.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/ByteSink.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-

jar/com/google/common/math/PairedStatsAccumulator.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/TypeCapture.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/reflect/TypeToInstanceMap.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/CharSource.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/Stats.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/ChecksumHashFunction.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/base/StandardSystemProperty.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/ServiceManager.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/AbstractByteHasher.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/CharSink.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/math/StatsAccumulator.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/xml/package-info.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/FilteredKeyMultimap.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/hash/SipHashFunction.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/util/concurrent/SmoothRateLimiter.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/io/MoreFiles.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableMapEntry.java
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*/
/**
  * Returns an array containing all of the elements in the specified collection. This method

* returns the elements in the order they are returned by the collection's iterator. The returned
 * array is "safe" in that no references to it are maintained by the collection. The caller is
 * thus free to modify the returned array.
 *
 * <p>This method assumes that the collection size doesn't change while the method is running.
 *
 * <p>TODO(kevinb): support concurrently modified collections?
 *
 * @param c the collection for which to return an array of elements
 */

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jar/com/google/common/collect/ObjectArrays.java
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jar/com/google/common/primitives/Doubles.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/Converter.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/escape/UnicodeEscaper.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Bytes.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Shorts.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Booleans.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Floats.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/Joiner.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/Stopwatch.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/io/MultiReader.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/net/PercentEscaper.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/thirdparty/publicsuffix/TrieParser.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/util/concurrent/ListenableFutureTask.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/net/InetAddresses.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/internal/Finalizer.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Ints.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/escape/Escaper.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/util/concurrent/SequentialExecutor.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Longs.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/io/FileBackedOutputStream.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/base/CharMatcher.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/FluentIterable.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/primitives/Chars.java
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*/
/**
* Holder for extra methods of {@code Objects} only in web. Intended to be empty for regular

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*/

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableSortedMultiset.java

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* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/Count.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/RangeSet.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/GeneralRange.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/RegularImmutableSortedMultiset.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/ImmutableSortedMultisetFauxverideShim.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/SortedIterables.java

* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-jar/com/google/common/collect/AbstractRangeSet.java

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jar/com/google/common/graph/package-info.java
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/**
* Outer class that exists solely to let us write {@code Partially.GwtIncompatible} instead of plain
* {@code GwtIncompatible}. This is more accurate for {@link Futures#catching}, which is available
* under GWT but with a slightly different signature.
*
* <p>We can't use {@code PartiallyGwtIncompatible} because then the GWT compiler wouldn't recognize
* it as a {@code GwtIncompatible} annotation. And for {@code Futures.catching}, we need the GWT
* compiler to autostrip the normal server method in order to expose the special, inherited GWT
* version.
*/
```

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jar/com/google/common/graph/MapRetrievalCache.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/HashMultimapGwtSerializationDependencies.java
* /opt/cola/permits/1530133681_1675768787.5786078/0/guava-29-0-jre-sources-
jar/com/google/common/collect/LinkedHashMultimapGwtSerializationDependencies.java
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jar/com/google/common/graph/MultiEdgesConnecting.java
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jar/com/google/common/graph/ValueGraphBuilder.java
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jar/com/google/common/graph/UndirectedNetworkConnections.java
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jar/com/google/common/graph/AbstractNetwork.java
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jar/com/google/common/graph/DirectedGraphConnections.java
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jar/com/google/common/collect/CollectCollectors.java
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jar/com/google/common/graph/AbstractValueGraph.java
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jar/com/google/common/graph/MutableValueGraph.java
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jar/com/google/common/graph/AbstractDirectedNetworkConnections.java
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1.111 snake-yaml 1.26

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1.112 rfc5545-datetime 0.2.4

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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

The Stempel analyzer (stempel) includes BSD-licensed software developed
by the Egothor project http://egothor.sf.net/, created by Leo Galambos, Martin Kvapil,
and Edmond Nolan.

The Polish analyzer (stempel) comes with a default
stopword list that is BSD-licensed created by the Carrot2 project. The file resides
in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt.
See https://github.com/carrot2/carrot2.

The SmartChineseAnalyzer source code (smartcn) was
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WordBreakTestUnicode_*.java (under modules/analysis/common/src/test/)
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The Morfologik analyzer (morfologik) includes BSD-licensed software
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(https://github.com/morfologik/morfologik-stemming) and uses
data from the BSD-licensed dictionary of Polish (SGJP, http://sgjp.pl/morfeusz/).

Servlet-api.jar and javax.servlet-*.jar are under the CDDL license, the original
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Kuromoji Japanese Morphological Analyzer - Apache Lucene Integration
===

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 mecab-ipadic-2.7.0-20070801

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or

 http://jaist.dl.sourceforge.net/project/mecab/mecab-ipadic/2.7.0-20070801/mecab-ipadic-2.7.0-20070801.tar.gz

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 mecab-ko-dic-2.0.3-20170922

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 https://bitbucket.org/eunjeon/mecab-ko-dic/downloads/mecab-ko-dic-2.0.3-20170922.tar.gz

The floating point precision conversion in NumericUtils.Float16Converter is derived from work by Jeroen van der Zijp, granted for use under the Apache license.

1.121 jackson-core 2.13.3

1.121.1 Available under license :

Jackson JSON processor

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1.122 netty-project 4.1.77.Final
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* /opt/cola/permits/1337097930_1654205407.148156/0/netty-codec-http-4-1-77-final-jar/META-
INF/maven/io.netty/netty-codec-http/pom.xml
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Manifest-Version: 1.0
Implementation-Title: Netty/Codec/HTTP
Bundle-Description: Netty is an asynchronous event-driven network appl
ication framework for   rapid development of maintainable high perfo
rmance protocol servers and   clients.
Automatic-Module-Name: io.netty.codec.http
Bundle-License: https://www.apache.org/licenses/LICENSE-2.0
Bundle-SymbolicName: io.netty.codec-http
Implementation-Version: 4.1.77.Final
Built-By: norman
Bnd-LastModified: 1651822967697
Bundle-ManifestVersion: 2
Implementation-Vendor-Id: io.netty
Bundle-DocURL: https://netty.io/
Bundle-Vendor: The Netty Project
Import-Package: com.aayushatharva.brotli4j.encoder;resolution:=optiona
l,com.jcraft.jzlib;resolution:=optional,io.netty.buffer;version="[4.1
,5)",io.netty.channel;version="[4.1,5)",io.netty.channel.embedded;ver
sion="[4.1,5)",io.netty.handler.codec,io.netty.handler.codec.base64;v
ersion="[4.1,5)",io.netty.handler.codec.compression;version="[4.1,5)"
,io.netty.handler.ssl;version="[4.1,5)",io.netty.handler.stream;versi
on="[4.1,5)",io.netty.util;version="[4.1,5)",io.netty.util.concurrent
;version="[4.1,5)",io.netty.util.internal;version="[4.1,5)",io.netty.
util.internal.logging;version="[4.1,5)",sun.nio.ch;resolution:=option
al,org.eclipse.jetty.npn;version="[1,2)";resolution:=optional,org.ecl
ipse.jetty.alpn;version="[1,2)";resolution:=optional
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.6))"
Tool: Bnd-2.4.1.201501161923
Implementation-Vendor: The Netty Project
Export-Package: io.netty.handler.codec.http;uses:="io.netty.buffer,io.
netty.channel,io.netty.channel.embedded,io.netty.handler.codec,io.net
ty.handler.codec.compression,io.netty.handler.codec.http.cookie,io.ne
tty.handler.stream,io.netty.util";version="4.1.77",io.netty.handler.c
odec.http.cookie;version="4.1.77",io.netty.handler.codec.http.cors;us
es:="io.netty.channel,io.netty.handler.codec.http";version="4.1.77",i
o.netty.handler.codec.http.multipart;uses:="io.netty.buffer,io.netty.
channel,io.netty.handler.codec,io.netty.handler.codec.http,io.netty.h
andler.stream,io.netty.util";version="4.1.77",io.netty.handler.codec.
http.websocketx;uses:="io.netty.buffer,io.netty.channel,io.netty.hand
ler.codec,io.netty.handler.codec.http,io.netty.handler.stream,io.nett

y.util,io.netty.util.internal.logging";version="4.1.77",io.netty.hand
ler.codec.http.websocketx.extensions;uses:="io.netty.channel,io.netty
.handler.codec,io.netty.handler.codec.http.websocketx";version="4.1.7
7",io.netty.handler.codec.http.websocketx.extensions.compression;uses
:="io.netty.channel,io.netty.handler.codec.http.websocketx.extensions
";version="4.1.77",io.netty.handler.codec.rtsp;uses:="io.netty.buffer
,io.netty.channel,io.netty.handler.codec.http,io.netty.util";version=
"4.1.77",io.netty.handler.codec.spdy;uses:="io.netty.buffer,io.netty.
channel,io.netty.handler.codec,io.netty.handler.codec.http,io.netty.u
til";version="4.1.77"
Bundle-Name: Netty/Codec/HTTP
Bundle-Version: 4.1.77.Final
Created-By: Apache Maven Bundle Plugin
Build-Jdk: 1.8.0_252
Implementation-URL: https://netty.io/netty-codec-http/

Found in path(s):
* /opt/cola/permits/1337097930_1654205407.148156/0/netty-codec-http-4-1-77-final-jar/META-
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image/io.netty/codec-http/native-image.properties

1.123 generex 1.0.1

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* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/Node.java

* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/Generex.java

* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/util/Iterable.java

* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/Main.java

* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/GenerexIterator.java

* /opt/cola/permits/1274699858_1645233601.99/0/generex-1-0-1-sources-jar/com/mifmif/common/regex/util/Iterator.java

1.124 jersey-container-grizzly2-http 2.25.1

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1.125 json-unit-core 1.5.2

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* /opt/cola/permits/1274703414_1645234163.08/0/json-unit-core-1-5-2-sources-jar/net/javacrumbs/jsonunit/core/internal/Differences.java
* /opt/cola/permits/1274703414_1645234163.08/0/json-unit-core-1-5-2-sources-jar/net/javacrumbs/jsonunit/core/internal/Converter.java
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* /opt/cola/permits/1274703414_1645234163.08/0/json-unit-core-1-5-2-sources-jar/net/javacrumbs/jsonunit/core/internal/Jackson2NodeFactory.java
* /opt/cola/permits/1274703414_1645234163.08/0/json-unit-core-1-5-2-sources-jar/net/javacrumbs/jsonunit/core/internal/Node.java

1.126 geb-ast 0.9.2

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* /opt/cola/permits/1354022995_1656537281.181739/0/geb-ast-0-9-2-sources-
jar/geb/transform/AttributeAccessingMetaClassRegisteringTransformation.groovy
* /opt/cola/permits/1354022995_1656537281.181739/0/geb-ast-0-9-2-sources-
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1.127 stringtemplate4 3.2
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INF/maven/org.antlr/stringtemplate/pom.xml

1.128 jersey-test-framework-core 2.25.1
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1.130 scala 2.12.5

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Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (a, b) => ... }
 val x: ((Int, Int) => Int) = (((a, b)) => a)
                     ^

not-a-legal-formal-parameter-tuple.scala:3: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple2,
    or consider a pattern matching anonymous function: `{ case (param1, param2) => ... }
 val y: ((Int, Int, Int) => Int) = (((a, !!)) => a)
                     ^

not-a-legal-formal-parameter-tuple.scala:4: error: not a legal formal parameter.
Note: Tuples cannot be directly destructured in method or function parameters.
    Either create a single parameter accepting the Tuple3,
    or consider a pattern matching anonymous function: `{ case (param1, ..., param3) => ... }
 val z: ((Int, Int, Int) => Int) = (((a, NotAPatternVariableName, c)) => a)
                     ^

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1.131 dropwizard-jackson-support 1.3.23

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core/src/java/org/apache/lucene/util/compress/LZ4.java is a Java implementation of the LZ4 (https://github.com/lz4/lz4/tree/dev/lib) compression format for Lucene's DataInput/DataOutput abstractions.

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Nori Korean Morphological Analyzer - Apache Lucene Integration

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This software includes a binary and/or source version of data from

 mecab-ko-dic-2.0.3-20170922

which can be obtained from

 https://bitbucket.org/eunjeon/mecab-ko-dic/downloads/mecab-ko-dic-2.0.3-20170922.tar.gz

The floating point precision conversion in NumericUtils.Float16Converter is derived from work by
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1.133 aws-java-sdk-for-amazon-ec2 1.10.76

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jar/com/amazonaws/services/ec2/model/DryRunResult.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/EC2RequestHandler.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/util/package-info.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/GeneratePreSignUrlRequestHandler.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/util/S3UploadPolicy.java
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```
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*/
/**
    * <p>
    * Describes the ID format settings for your resources on a per-region
    * basis, for example, to view which resource types are enabled for longer
    * IDs. This request only returns information about resource types whose ID
    * formats can be modified; it does not return information about other
    * resource types.
    * </p>
    * <p>
    * The following resource types support longer IDs: <code>instance</code> |
    * <code>reservation</code> | <code>snapshot</code> | <code>volume</code>.
    * </p>
    * <p>
    * These settings apply to the IAM user who makes the request; they do not
    * apply to the entire AWS account. By default, an IAM user defaults to the
    * same settings as the root user, unless they explicitly override the
    * settings by running the <a>ModifyIdFormat</a> command. Resources created
    * with longer IDs are visible to all IAM users, regardless of these
    * settings and provided that they have permission to use the relevant
    * <code>Describe</code> command for the resource type.
    * </p>
    *
    * @param describeIdFormatRequest
    *        Contains the parameters for DescribeIdFormat.
    * @return Result of the DescribeIdFormat operation returned by the service.
    * @sample AmazonEC2.DescribeIdFormat
    */
/**
    * <p>
    * Modifies the ID format for the specified resource on a per-region basis.
    * You can specify that resources should receive longer IDs (17-character
    * IDs) when they are created. The following resource types support longer
    * IDs: <code>instance</code> | <code>reservation</code> |
    * <code>snapshot</code> | <code>volume</code>.
    * </p>
    * <p>
    * This setting applies to the IAM user who makes the request; it does not
    * apply to the entire AWS account. By default, an IAM user defaults to the
    * same settings as the root user. If you're using this action as the root
    * user or as an IAM role that has permission to use this action, then these
    * settings apply to the entire account, unless an IAM user explicitly
    * overrides these settings for themselves. For more information, see <a
    * href=
    * "http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/resource-ids.html#resource-ids-access"
    * >Controlling Access to Longer ID Settings</a> in the <i>Amazon Elastic
    * Compute Cloud User Guide</i>.
```

```
* </p>
* <p>
* Resources created with longer IDs are visible to all IAM users,
* regardless of these settings and provided that they have permission to
* use the relevant <code>Describe</code> command for the resource type.
* </p>
*
* @param modifyIdFormatRequest
*        Contains the parameters of ModifyIdFormat.
* @sample AmazonEC2.ModifyIdFormat
*/
```

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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/AmazonEC2.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/AmazonEC2Client.java
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*/
/**
* <p>
* Describes the ID format settings for your resources on a per-region
* basis, for example, to view which resource types are enabled for longer
* IDs. This request only returns information about resource types whose ID
* formats can be modified; it does not return information about other
* resource types.
* </p>
* <p>
* The following resource types support longer IDs: <code>instance</code> |
* <code>reservation</code> | <code>snapshot</code> | <code>volume</code>.
* </p>
* <p>
* These settings apply to the IAM user who makes the request; they do not
```

```
 * apply to the entire AWS account. By default, an IAM user defaults to the
 * same settings as the root user, unless they explicitly override the
 * settings by running the <a>ModifyIdFormat</a> command. Resources created
 * with longer IDs are visible to all IAM users, regardless of these
 * settings and provided that they have permission to use the relevant
 * <code>Describe</code> command for the resource type.
 * </p>
 *
 * @param describeIdFormatRequest
 *        Contains the parameters for DescribeIdFormat.
 * @return A Java Future containing the result of the DescribeIdFormat
 *         operation returned by the service.
 * @sample AmazonEC2Async.DescribeIdFormat
 */
/**
 * <p>
 * Modifies the ID format for the specified resource on a per-region basis.
 * You can specify that resources should receive longer IDs (17-character
 * IDs) when they are created. The following resource types support longer
 * IDs: <code>instance</code> | <code>reservation</code> |
 * <code>snapshot</code> | <code>volume</code>.
 * </p>
 * <p>
 * This setting applies to the IAM user who makes the request; it does not
 * apply to the entire AWS account. By default, an IAM user defaults to the
 * same settings as the root user. If you're using this action as the root
 * user or as an IAM role that has permission to use this action, then these
 * settings apply to the entire account, unless an IAM user explicitly
 * overrides these settings for themselves. For more information, see <a
 * href=
 * "http://docs.aws.amazon.com/AWSEC2/latest/UserGuide/resource-ids.html#resource-ids-access"
 * >Controlling Access to Longer ID Settings</a> in the <i>Amazon Elastic
 * Compute Cloud User Guide</i>.
 * </p>
 * <p>
 * Resources created with longer IDs are visible to all IAM users,
 * regardless of these settings and provided that they have permission to
 * use the relevant <code>Describe</code> command for the resource type.
 * </p>
 *
 * @param modifyIdFormatRequest
 *        Contains the parameters of ModifyIdFormat.
 * @sample AmazonEC2Async.ModifyIdFormat
 */
```

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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/DeleteInternetGatewayRequestMarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/DeleteSubnetRequest.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/RebootInstancesRequest.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-

jar/com/amazonaws/services/ec2/model/transform/AllocateHostsRequestMarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/SpotInstanceStatus.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/TagDescriptionStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/DescribeReservedInstancesRequestMarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/ListingState.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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jar/com/amazonaws/services/ec2/model/RevokeSecurityGroupEgressRequest.java
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/DescribeImageAttributeResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/Reservation.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/CreateVpcResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/ModifyImageAttributeRequestMarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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jar/com/amazonaws/services/ec2/model/ImportKeyPairResult.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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jar/com/amazonaws/services/ec2/model/transform/RunInstancesResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/CreateRouteResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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jar/com/amazonaws/services/ec2/model/transform/CreateReservedInstancesListingResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/transform/DescribeClassicLinkInstancesResultStaxUnmarshaller.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/DescribeVpcClassicLinkDnsSupportResult.java
* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-

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jar/com/amazonaws/services/ec2/model/transform/DescribeSnapshotsResultStaxUnmarshaller.java

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jar/com/amazonaws/services/ec2/model/transform/DescribeExportTasksResultStaxUnmarshaller.java

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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/ImportVolumeTaskDetails.java

* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
jar/com/amazonaws/services/ec2/model/DescribeAccountAttributesRequest.java

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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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* /opt/cola/permits/1354022539_1658958787.4292438/0/aws-java-sdk-ec2-1-10-76-sources-
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1.134 t-digest 3.2

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1.135 json-unit 1.5.2

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jar/net/javacrumbs/jsonunit/JsonMatchers.java

* /opt/cola/permits/1274700242_1645234549.97/0/json-unit-1-5-2-sources-
jar/net/javacrumbs/jsonunit/ConfigurableJsonMatcher.java

* /opt/cola/permits/1274700242_1645234549.97/0/json-unit-1-5-2-sources-jar/net/javacrumbs/jsonunit/JsonAssert.java

1.136 awaitility 4.1.1

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jar/org/awaitility/core/HamcrestExceptionIgnorer.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/pollinterval/IterativePollInterval.java
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jar/org/awaitility/classpath/ClassPathResolver.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/pollinterval/FixedPollInterval.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/DeadlockException.java
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* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/ThrowingRunnable.java
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* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/EvaluatedCondition.java
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jar/org/awaitility/core/ConditionEvaluationHandler.java
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* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/reflect/FieldMatcherStrategy.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/reflect/FieldTypeMatcherStrategy.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/ConditionEvaluationListener.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/HamcrestToStringFilter.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/FieldSupplierBuilder.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/reflect/exception/TooManyFieldsFoundException.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/AbstractHamcrestCondition.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/Condition.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/reflect/exception/FieldNotFoundException.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-jar/org/awaitility/core/ConditionSettings.java
* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-

jar/org/awaitility/core/ConditionAwaiter.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/core/CallableHamcrestCondition.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/core/ConditionEvaluationLogger.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/core/ConditionFactory.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/reflect/FieldNameMatcherStrategy.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/core/CallableCondition.java

* /opt/cola/permits/1290493612_1647560249.43/0/awaitility-4-1-1-sources-
jar/org/awaitility/reflect/FieldAnnotationMatcherStrategy.java

1.137 args4j 2.32

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1.138 beanshell 2.0b4

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* /opt/cola/permits/1354022545_1658979710.1403263/0/converter-jackson-2-3-0-sources-jar/retrofit2/converter/jackson/JacksonConverterFactory.java

* /opt/cola/permits/1354022545_1658979710.1403263/0/converter-jackson-2-3-0-sources-jar/retrofit2/converter/jackson/JacksonResponseBodyConverter.java

1.141 jetty-java-based-http-1-x-http-2-servlet-websocket-server 9.4.20.v20190813

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Eclipse

The following artifacts are EPL.

* org.eclipse.jetty.orbit:org.eclipse.jdt.core

The following artifacts are EPL and ASL2.
* org.eclipse.jetty.orbit:javax.security.auth.message

The following artifacts are EPL and CDDL 1.0.
* org.eclipse.jetty.orbit:javax.mail.glassfish

Oracle

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https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

* javax.servlet:javax.servlet-api
* javax.annotation:javax.annotation-api
* javax.transaction:javax.transaction-api
* javax.websocket:javax.websocket-api

Oracle OpenJDK

If ALPN is used to negotiate HTTP/2 connections, then the following
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module is selected.

* java.sun.security.ssl

These artifacts replace/modify OpenJDK classes. The modififications
are hosted at github and both modified and original are under GPL v2 with
classpath exceptions.
http://openjdk.java.net/legal/gplv2+ce.html

OW2

The following artifacts are licensed by the OW2 Foundation according to the
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org.ow2.asm:asm-commons
org.ow2.asm:asm

Apache

The following artifacts are ASL2 licensed.

org.apache.taglibs:taglibs-standard-spec
org.apache.taglibs:taglibs-standard-impl

MortBay

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org.mortbay.jasper:apache-jsp
 org.apache.tomcat:tomcat-jasper
 org.apache.tomcat:tomcat-juli
 org.apache.tomcat:tomcat-jsp-api
 org.apache.tomcat:tomcat-el-api
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-api
 org.apache.tomcat:tomcat-util-scan
 org.apache.tomcat:tomcat-util

org.mortbay.jasper:apache-el
 org.apache.tomcat:tomcat-jasper-el
 org.apache.tomcat:tomcat-el-api

Mortbay

The following artifacts are CDDL + GPLv2 with classpath exception.

https://glassfish.dev.java.net/nonav/public/CDDL+GPL.html

org.eclipse.jetty.toolchain:jetty-schemas

Assorted

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1.142 metrics---dropwizard 3.2.5

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Manifest-Version: 1.0

Bnd-LastModified: 1505464718471

Build-Jdk: 1.8.0_131

Built-By: artem

Bundle-Description: An Apache HttpClient wrapper providing Metrics instr

umentation of connection pools, request   durations and rates, and

 other useful information.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Integration for Apache HttpClient

Bundle-SymbolicName: io.dropwizard.metrics.httpclient

Bundle-Version: 3.2.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.httpclient;uses:="org.apache.http.c

lient,com.codahale.metrics,org.apache.http,org.apache.http.client.utils

,org.apache.http.client.methods,org.apache.http.config,org.apache.http.

pool,org.apache.http.conn,org.apache.http.conn.ssl,org.apache.http.impl

.conn,org.apache.http.conn.socket,org.apache.http.conn.routing,org.apac

he.http.protocol,org.apache.http.impl.client";version="3.2.5"

Implementation-Title: Metrics Integration for Apache HttpClient

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 3.2.5

Import-Package: com.codahale.metrics;version="[3.2,4)",org.apache.http,o

rg.apache.http.client,org.apache.http.client.methods,org.apache.http.cl

ient.utils,org.apache.http.config,org.apache.http.conn,org.apache.http.

conn.routing,org.apache.http.conn.socket,org.apache.http.conn.ssl,org.a

pache.http.impl.client,org.apache.http.impl.conn,org.apache.http.pool,o

rg.apache.http.protocol

Tool: Bnd-1.50.0

Found in path(s):

* /opt/cola/permits/1274705416_1648835832.71/0/metrics-httpclient-3-2-5-jar/META-INF/MANIFEST.MF

1.143 randomizedtesting 2.8.1

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* /opt/cola/permits/1547606372_1675766544.2231193/0/randomizedtesting-runner-2-8-1-sources-jar/com/carrotsearch/randomizedtesting/rules/NoInstanceHooksOverridesRule.java

* /opt/cola/permits/1547606372_1675766544.2231193/0/randomizedtesting-runner-2-8-1-sources-jar/com/carrotsearch/randomizedtesting/rules/NoClassHooksShadowingRule.java

* /opt/cola/permits/1547606372_1675766544.2231193/0/randomizedtesting-runner-2-8-1-sources-jar/com/carrotsearch/randomizedtesting/rules/RequireAssertionsRule.java

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* /opt/cola/permits/1547606372_1675766544.2231193/0/randomizedtesting-runner-2-8-1-sources-jar/com/carrotsearch/randomizedtesting/rules/RamUsageEstimator.java

1.144 error_prone_annotations 2.0.2

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* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/concurrent/LockMethod.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/concurrent/UnlockMethod.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/NoAllocation.java

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* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/IncompatibleModifiers.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-

jar/com/google/errorprone/annotations/CompileTimeConstant.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/CanIgnoreReturnValue.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/ForOverride.java
* /opt/cola/permits/1290493585_1647560234.34/0/error-prone-annotations-2-0-2-sources-
jar/com/google/errorprone/annotations/RequiredModifiers.java

1.145 lucene-sandbox 9.3.0
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1.148 objenesis 2.2

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
jar/com/mysql/cj/protocol/PacketReceivedTimeHolder.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
jar/com/mysql/cj/jdbc/result/ResultSetFactory.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
jar/com/mysql/cj/protocol/SerializingBufferWriter.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
jar/com/mysql/cj/protocol/a/ColumnDefinitionFactory.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
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jar/com/mysql/cj/protocol/ProtocolEntity.java
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jar/com/mysql/cj/protocol/ProtocolEntityFactory.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-
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jar/com/mysql/cj/protocol/a/AbstractRowFactory.java

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/**
   * Does this plugin require the connection itself to be confidential
   * (i.e. tls/ssl)...Highly recommended to return "true" for plugins
   * that return the credentials in the clear.
   *
   * @return true if secure connection is required
   */
```

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/a/result/TextBufferRow.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/interceptors/ResultSetScannerInterceptor.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/result/CachedResultSetMetaDataImpl.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/ClientInfoProvider.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/a/result/ByteArrayRow.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/log/ProfilerEventHandler.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/result/AbstractResultsetRow.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/ha/BalanceStrategy.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/interceptors/ServerStatusDiffInterceptor.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/ha/RandomBalanceStrategy.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/log/LoggingProfilerEventHandler.java
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/ha/LoadBalancedMySQLConnection.java
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/Client.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/util/DataTypeUtil.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XProtocolError.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/JdbcPreparedStatement.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/MessageReader.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XMessage.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XMessageHeader.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/ClientImpl.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XServerSession.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/DataStoreMetadata.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/Message.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/jdbc/SocketFactoryWrapper.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/MessageBuilder.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/result/CachedResultSetMetaData.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XAuthenticationProvider.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/DataStoreMetadataImpl.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/QueryResult.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/MessageHeader.java

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/XServerCapabilities.java

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/DbDoc.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/FilterParams.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/conf/PropertyKey.java

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/exceptions/UnsupportedConnectionStringException.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/AsyncSocketFactory.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/x/Notice.java

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*/
/**
 * Check if given plugin requires confidentiality, but connection is without SSL
 *
 * @param plugin
 *          {@link AuthenticationPlugin}
 */
```

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```

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/MysqlXid.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/MysqlXADataSource.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/exceptions/MySQLTransactionRollbackException.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/exceptions/MySQLStatementCancelledException.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/MysqlParameterMetadata.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/exceptions/MySQLTimeoutException.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/MysqlXAException.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/MysqlXAConnection.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/DatabaseMetaDataUsingInfoSchema.java

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/SimpleQuery.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/TransactionEventHandler.java
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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/AbstractPreparedQuery.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/AddResult.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/InsertResult.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/ServerPreparedQuery.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/log/BaseMetricsHolder.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/a/NativeMessageBuilder.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/BindValue.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/CancelQueryTaskImpl.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/protocol/a/authentication/CachingSha2PasswordPlugin.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/AbstractQuery.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/ServerPreparedQueryTestcaseGenerator.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/PreparedQuery.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/QueryBindings.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/InsertResultImpl.java
* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/ClientPreparedQuery.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/xdevapi/AddResultImpl.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/AppendingBatchVisitor.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/Query.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/conf/EnumProperty.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/jdbc/ha/ServerAffinityStrategy.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/conf/EnumPropertyDefinition.java

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* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/AbstractQueryBindings.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/ParseInfo.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/exceptions/ExceptionInterceptorChain.java

* /opt/cola/permits/1274704317_1658977185.4623668/0/mysql-connector-java-8-0-13-sources-jar/com/mysql/cj/ClientPreparedQueryBindValue.java

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1.150 dropwizard-database-support 1.3.2

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1.151 jackson-integration-for-metrics 4.0.5

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Bnd-LastModified: 1545938158164

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: A set of Jackson modules which provide serializers
 for most Metrics classes.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Jackson Integration for Metrics

Bundle-SymbolicName: io.dropwizard.metrics.json

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.json;uses:="com.codahale.metrics,
com.fasterxml.jackson.core,com.fasterxml.jackson.databind";version="4
.0.5"

Implementation-Title: Jackson Integration for Metrics

Implementation-URL: http://metrics.dropwizard.io/metrics-json

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: com.codahale.metrics;version="[4.0,5)",com.codahale.me
trics.health;version="[4.0,5)";resolution:=optional,com.fasterxml.jac
kson.core;version="[2.9,3)",com.fasterxml.jackson.databind;version="[
2.9,3)",com.fasterxml.jackson.databind.module;version="[2.9,3)",com.f
asterxml.jackson.databind.ser;version="[2.9,3)",com.fasterxml.jackson
.databind.ser.std;version="[2.9,3)"

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274705522_1648836004.08/0/metrics-json-4-0-5-jar/META-INF/MANIFEST.MF

1.152 osgi-resource-locator-bundle 1.0.1

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Found in path(s):
* /opt/cola/permits/1355542192_1657242161.3388643/0/osgi-resource-locator-1-0-1-jar/META-
INF/maven/org.glassfish.hk2/osgi-resource-locator/pom.xml
No license file was found, but licenses were detected in source scan.

Manifest-Version: 1.0
Archiver-Version: Plexus Archiver
Created-By: 1.6.0_14 (Sun Microsystems Inc.)
Built-By: java_re
Build-Jdk: 1.6.0_14
Export-Package: org.glassfish.hk2.osgiresourcelocator;uses:="org.osgi.
framework";version="1.0.1"
Bundle-ActivationPolicy: lazy
Tool: Bnd-0.0.357
Bundle-Name: OSGi resource locator bundle - used by various API provid

ers that rely on META-INF/services mechanism to locate providers.

Bundle-Vendor: GlassFish Community

Bundle-Version: 1.0.1

Bnd-LastModified: 1294930782379

Bundle-Activator: org.glassfish.hk2.osgiresourcelocator.Activator

Bundle-ManifestVersion: 2

Bundle-License: https://glassfish.dev.java.net/nonav/public/CDDL+GPL.h
tml

Bundle-Description: See http://wiki.glassfish.java.net/Wiki.jsp?page=J
dkSpiOsgi for more information

Import-Package: org.glassfish.hk2.osgiresourcelocator;version="[1.0,1.
1)",org.osgi.framework;version="1.5"

Bundle-SymbolicName: org.glassfish.hk2.osgi-resource-locator

Bundle-DocURL: https://glassfish.dev.java.net

Found in path(s):
* /opt/cola/permits/1355542192_1657242161.3388643/0/osgi-resource-locator-1-0-1-jar/META-
INF/MANIFEST.MF

1.153 apache-commons-text 1.2

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1.154 javassist 3.18.2-GA

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Found in path(s):
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/scopedpool/ScopedClassPoolRepositoryImpl.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/BadBytecode.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/convert/TransformFieldAccess.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/Member.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/web/Webserver.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/reflect/Metaobject.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/Symbol.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/HotSwapper.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/InnerClassesAttribute.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/AnnotationsAttribute.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/AnnotationsWriter.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CannotCompileException.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/proxy/ProxyObject.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/analysis/SubroutineScanner.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/InstructionPrinter.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/ByteArrayClassPath.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/ParameterAnnotationsAttribute.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/StringL.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/proxy/Proxy.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtMethod.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/rmi/RemoteRef.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/ClassMap.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/expr/MethodCall.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/analysis/ControlFlow.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/CodeIterator.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/proxy/MethodHandler.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/stackmap/Tracer.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/Modifier.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/scopedpool/ScopedClassPoolFactory.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/ClassPath.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/Descriptor.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/CondExpr.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/analysis/IntQueue.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/ASTree.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/AccessFlag.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtClassType.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/Keyword.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtPrimitiveType.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/reflect/Sample.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/reflect/Compiler.java
* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/proxy/RuntimeSupport.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtConstructor.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/LongVector.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/stackmap/MapMaker.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/stackmap/TypeData.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/ast/ASTList.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/util/proxy/ProxyObjectOutputStream.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtNewConstructor.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtClass.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtNewWrappedMethod.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtArray.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/ExceptionTable.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/ByteStream.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/Parser.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/NotFoundException.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/ClassClassPath.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/Javac.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/tools/Dump.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtNewClass.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/stackmap/BasicBlock.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/CtBehavior.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/convert/TransformNew.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/MemberResolver.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/StackMap.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/convert/TransformWriteField.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/compiler/JvstCodeGen.java
 * /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/Loader.java
 * /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/Mnemonic.java
 * /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/NoSuchClassError.java
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* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/MemberValueVisitor.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/ByteMemberValue.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/ClassMemberValue.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/MemberValue.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/AnnotationMemberValue.java

* /opt/ws_local/PERMITS_SQL/1014221952_1591370586.83/0/javassist-3-18-2-ga-sources-jar/javassist/bytecode/annotation/BooleanMemberValue.java

1.155 java-unified-expression-language juel-2.2.7

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jar/de/odysseus/el/tree/impl/ast/AstDot.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/misc/NumberOperations.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstParameters.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstFunction.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstProperty.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/ExpressionFactoryImpl.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstBinary.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/misc/TypeConverterImpl.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstString.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/Parser.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstRightValue.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstNumber.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstChoice.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/Bindings.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstComposite.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/TreeCache.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/util/SimpleContext.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstNested.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/Scanner.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/TreeBuilderException.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/TreeMethodExpression.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/misc/LocalMessages.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/tree/impl/ast/AstEval.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-
jar/de/odysseus/el/misc/BooleanOperations.java
* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-

jar/de/odysseus/el/ObjectValueExpression.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/Tree.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstBracket.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstText.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/NodePrinter.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/TreeValueExpression.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstLiteral.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/IdentifierNode.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstIdentifier.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstUnary.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstNode.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/Node.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstMethod.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/Builder.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstNull.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/ast/AstBoolean.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/TreeStore.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/util/RootPropertyResolver.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/tree/impl/Cache.java

* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/util/SimpleResolver.java

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* /opt/cola/permits/1274698952_1650662358.22/0/juel-impl-2-2-7-sources-1-jar/de/odysseus/el/misc/TypeConverter.java

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1.156 cglib 2.1_3

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jar/net/sf/cglib/transform/impl/AbstractInterceptFieldCallback.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/core/MethodInfo.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/CallbackHelper.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/core/RejectModifierPredicate.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/MixinEverythingEmitter.java

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jar/net/sf/cglib/core/ClassInfo.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/impl/AddInitTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/core/MethodInfoTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/InterfaceMaker.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/AbstractClassFilterTransformer.java

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jar/net/sf/cglib/proxy/UndeclaredThrowableException.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/Factory.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/MethodInterceptor.java
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jar/net/sf/cglib/proxy/InvocationHandler.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/util/ParallelSorterEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/FixedValue.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-

jar/net/sf/cglib/transform/ClassVisitorTee.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/TransformingClassGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/impl/AddPropertyTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/core/ClassEmitter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/impl/UndeclaredThrowableStrategy.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/NullClassVisitor.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/impl/InterceptFieldFilter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/util/ParallelSorter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/ClassTransformerTee.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/MethodFilterTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/transform/impl/AddDelegateTransformer.java

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jar/net/sf/cglib/transform/MethodFilter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/util/StringSwitcher.java

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jar/net/sf/cglib/transform/impl/UndeclaredThrowableTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/core/ObjectSwitchCallback.java

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jar/net/sf/cglib/core/ProcessArrayCallback.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
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jar/net/sf/cglib/beans/FixedKeySet.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/DuplicatesPredicate.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/Predicate.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/Callback.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/TransformingClassLoader.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/FastConstructor.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/Signature.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/Local.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/Block.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/ClassFilter.java

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* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-

jar/net/sf/cglib/core/ProcessSwitchCallback.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/impl/InterceptFieldEnabled.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/Converter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/hook/AbstractPreProcessor.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/NoOp.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/LazyLoader.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/util/SorterTemplate.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/BeanGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/DefaultGeneratorStrategy.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/impl/AccessFieldTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/NamingPolicy.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/AbstractClassTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/MixinBeanEmitter.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/hook/AsmClassLoaderPreProcessor.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/impl/FieldProvider.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/ClassReaderGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/impl/InterceptFieldCallback.java

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jar/net/sf/cglib/transform/AbstractTransformTask.java
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* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-
jar/net/sf/cglib/proxy/FixedValueGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/CodeEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/MethodDelegate.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/ClassFilterTransformer.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/FastClassEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/CallbackFilter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/BulkBeanEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/VisibilityPredicate.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/ImmutableBean.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/DebuggingClassWriter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/AbstractClassGenerator.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/BeanMapEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/Mixin.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/MixinEmitter.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/ReflectUtils.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/DispatcherGenerator.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/DefaultNamingPolicy.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/BeanMap.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/ClassTransformerChain.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/NoOpGenerator.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/KeyFactory.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/MethodProxy.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/FastClass.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/InvocationHandlerGenerator.java
* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/CollectionUtils.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/MethodWrapper.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/MulticastDelegate.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/CallbackGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/AbstractClassLoader.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/transform/impl/AddStaticInitTransformer.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/EmitUtils.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/MethodInterceptorGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/reflect/FastMethod.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/beans/BeanCopier.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/LazyLoaderGenerator.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/core/TypeUtils.java

* /opt/ws_local/PERMITS_SQL/1018922653_1591358143.99/0/cglib-2-1-3-sources-jar/net/sf/cglib/proxy/Proxy.java

1.157 scala-java8-compat_2.12 0.8.0

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1.158 metrics-integration-with-jmx 4.0.5

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Manifest-Version: 1.0

Bnd-LastModified: 1545938260836

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: A set of classes which allow you to report metrics
 via JMX.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Integration with JMX

Bundle-SymbolicName: io.dropwizard.metrics.jmx

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.jmx;uses:="com.codahale.metrics,j
avax.management";version="4.0.5"

Implementation-Title: Metrics Integration with JMX

Implementation-URL: http://metrics.dropwizard.io/metrics-jmx

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: org.slf4j;version="[1.6.0,2.0.0)",com.codahale.metrics
;version="[4.0,5)",javax.management

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274704779_1648835825.49/0/metrics-jmx-4-0-5-jar/META-INF/MANIFEST.MF

1.159 mockito v2.24.5

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1.160 project-lombok 1.18.22

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1.161 elasticsearch-core 8.4.3

1.162 javax.inject:javax.inject 1
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* /opt/cola/permits/1299411403_1650627395.55/0/javax-inject-1-sources-jar/javax/inject/Singleton.java

1.163 dropwizard-asset-bundle 1.3.23
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1.164 javassist 3_26_0_ga

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1.165 jackson-dataformat-yaml 2.10.2

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1.166 dropwizard-request-logging-support 1.3.23

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1.167 jackson-datatype-joda 2.7.9

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1.168 asm-tree 9.2

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* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/JumpInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/ModuleProvideNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/AnnotationNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/VarInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/TryCatchBlockNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/LocalVariableAnnotationNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/IntInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/InvokeDynamicInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/TypeInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/FieldNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/TypeAnnotationNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/Util.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/InsnList.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/ModuleExportNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/AbstractInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/ClassNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/IincInsnNode.java
* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-

jar/org/objectweb/asm/tree/MultiANewArrayInsnNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/LdcInsnNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/InsnNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-jar/org/objectweb/asm/tree/LabelNode.java

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jar/org/objectweb/asm/tree/FrameNode.java

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jar/org/objectweb/asm/tree/MethodInsnNode.java

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jar/org/objectweb/asm/tree/LookupSwitchInsnNode.java

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jar/org/objectweb/asm/tree/RecordComponentNode.java

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jar/org/objectweb/asm/tree/TableSwitchInsnNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/InnerClassNode.java

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jar/org/objectweb/asm/tree/FieldInsnNode.java

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* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/ParameterNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/LocalVariableNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/ModuleOpenNode.java

* /opt/cola/permits/1288695058_1647366277.34/0/asm-tree-9-2-sources-
jar/org/objectweb/asm/tree/LineNumberNode.java

1.169 jackson-module-afterburner 2.10.3

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1.170 jackson-dataformats-binary 2.10.3

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Manifest-Version: 1.0

Bnd-LastModified: 1583206041670

Build-Jdk: 1.8.0_162

Built-By: tatu

Bundle-Description: Support for reading and writing protobuf-encoded d
ata via Jacksonabstractions.

Bundle-DocURL: http://github.com/FasterXML/jackson-dataformats-binary

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt

Bundle-ManifestVersion: 2

Bundle-Name: Jackson dataformat: protobuf

Bundle-SymbolicName: com.fasterxml.jackson.dataformat.jackson-dataform
at-protobuf

Bundle-Vendor: FasterXML

Bundle-Version: 2.10.3

Created-By: Apache Maven Bundle Plugin

Export-Package: com.fasterxml.jackson.dataformat.protobuf;version="2.1
0.3";uses:="com.fasterxml.jackson.core,com.fasterxml.jackson.core.bas
e,com.fasterxml.jackson.core.format,com.fasterxml.jackson.core.io,com
.fasterxml.jackson.core.json,com.fasterxml.jackson.core.type,com.fast
erxml.jackson.core.util,com.fasterxml.jackson.databind,com.fasterxml.
jackson.databind.cfg,com.fasterxml.jackson.dataformat.protobuf.schema
",com.fasterxml.jackson.dataformat.protobuf.schema;version="2.10.3";u
ses:="com.fasterxml.jackson.core,com.fasterxml.jackson.databind,com.f
asterxml.jackson.dataformat.protobuf",com.fasterxml.jackson.dataforma
t.protobuf.schemagen;version="2.10.3";uses:="com.fasterxml.jackson.da
tabind,com.fasterxml.jackson.databind.jsonFormatVisitors,com.fasterxm
l.jackson.dataformat.protobuf.schema"

Implementation-Build-Date: 2020-03-03 03:26:42+0000

Implementation-Title: Jackson dataformat: protobuf

Implementation-Vendor: FasterXML

Implementation-Vendor-Id: com.fasterxml.jackson.dataformat

Implementation-Version: 2.10.3

Import-Package: com.fasterxml.jackson.core;version="[2.10,3)",com.fast
erxml.jackson.core.base;version="[2.10,3)",com.fasterxml.jackson.core
.format;version="[2.10,3)",com.fasterxml.jackson.core.io;version="[2.
10,3)",com.fasterxml.jackson.core.json;version="[2.10,3)",com.fasterx
ml.jackson.core.type;version="[2.10,3)",com.fasterxml.jackson.core.ut
il;version="[2.10,3)",com.fasterxml.jackson.databind;version="[2.10,3
)",com.fasterxml.jackson.databind.cfg;version="[2.10,3)",com.fasterxm

l.jackson.databind.jsonFormatVisitors;version="[2.10,3)",com.fasterxm
l.jackson.databind.type;version="[2.10,3)",com.fasterxml.jackson.data
format.protobuf;version="[2.10,3)"
Private-Package: com.squareup.protoparser
Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.7))"
Specification-Title: Jackson dataformat: protobuf
Specification-Vendor: FasterXML
Specification-Version: 2.10.3
Tool: Bnd-4.2.0.201903051501
X-Compile-Source-JDK: 1.7
X-Compile-Target-JDK: 1.7

Found in path(s):
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com.fasterxml.jackson.dataformat.protobuf.ProtobufFactory

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INF/services/com.fasterxml.jackson.core.JsonFactory

1.171 dropwizard-lifecycle-support 1.3.23

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1.172 iterators 1.5

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* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/FilteredIterator.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/SerialIterator.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/UnquotedSplit.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/Filter.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-

jar/org/dmfs/iterators/decorators/Flattened.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/NoneOf.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/SerialIterableIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Reverse.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/Repeatable.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/Distinct.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/NonNull.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Flattened.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/Function.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/Skip.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/decorators/Serialized.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/CachingIterable.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/AbstractBaseIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/AbstractFilteredIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/DistinctIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/CsvIterable.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/EmptyIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/SingletonIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/Distinct.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/CsvIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Mapped.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/decorators/Fluent.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/decorators/Filtered.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/filters/AnyOf.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/decorators/Mapped.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/decorators/Filtered.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/ArrayIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/Split.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/FluentIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/AbstractConvertedIterator.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/Split.java
* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-

jar/org/dmfs/iterators/SerialIteratorIterator.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-
jar/org/dmfs/iterators/ConvertedIterator.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterators/UnquotedSplit.java

* /opt/cola/permits/1162864298_1620923965.62/0/iterators-1-5-sources-1-jar/org/dmfs/iterables/ArrayIterable.java

1.173 expression-language 3.0.0

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* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/http/Transport.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/http/HttpTransport.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/http/SpdyTransport.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/Util.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/http/HttpConnection.java

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jar/com/squareup/okhttp/Address.java

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jar/com/squareup/okhttp/internal/Internal.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/RequestBody.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/CertificatePinner.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/MultipartBuilder.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-jar/com/squareup/okhttp/Call.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/HttpMethod.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Credentials.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Challenge.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
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* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/ws/WebSocket.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/ResponseBody.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/Version.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/ws/WebSocketReader.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
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* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/ws/WebSocketListener.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/RealResponseBody.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/ConnectionSpec.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/ws/Protocol.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/TlsVersion.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Protocol.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Callback.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/CipherSuite.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/ws/WebSocketWriter.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/PushObserver.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/CacheRequest.java
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jar/com/squareup/okhttp/ConnectionPool.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/tls/OkHostnameVerifier.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/OptionalMethod.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Headers.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/tls/DistinguishedNameParser.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/internal/http/HttpEngine.java
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jar/com/squareup/okhttp/internal/spdy/FrameReader.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/FrameWriter.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/HttpDate.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/DiskLruCache.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/SpdyStream.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/IncomingStreamHandler.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/Spdy3.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/HeaderParser.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
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jar/com/squareup/okhttp/internal/spdy/NameValueBlockReader.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Request.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Authenticator.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Route.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/InternalCache.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Dispatcher.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Response.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-

jar/com/squareup/okhttp/MediaType.java

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jar/com/squareup/okhttp/internal/spdy/ErrorCode.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/HeadersMode.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/HpackDraft10.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/Variant.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/Handshake.java

* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/AuthenticatorAdapter.java

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jar/com/squareup/okhttp/internal/NamedRunnable.java

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jar/com/squareup/okhttp/internal/RouteDatabase.java

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jar/com/squareup/okhttp/Cache.java
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jar/com/squareup/okhttp/internal/http/RetryableSink.java
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jar/com/squareup/okhttp/internal/spdy/Settings.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/http/RouteSelector.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/OkHttpClient.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/spdy/Ping.java
* /opt/cola/permits/1354023295_1656537279.6055768/0/okhttp-2-2-0-sources-1-
jar/com/squareup/okhttp/internal/Network.java

1.178 elasticsearch 8.4.3

1.179 dropwizard-jetty-support 1.3.23

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* /opt/cola/permits/1274705307_1649200920.58/0/dropwizard-jetty-1-3-23-sources-jar/io/dropwizard/jetty/LocalIpFilter.java

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1.181 scala-parser-combinators 1.0.5

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jar/org/yaml/snakeyaml/resolver/Resolver.java

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* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/FlowSequenceStartToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/serializer/Serializer.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/BlockEntryToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/parser/ParserException.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/TypeDescription.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/error/MarkedYAMLException.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/StreamStartEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-

jar/org/yaml/snakeyaml/scanner/SimpleKey.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/AnchorToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/constructor/ConstructorException.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/FlowSequenceEndToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/DirectiveToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/SequenceStartEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/introspector/FieldProperty.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/DocumentEndToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/ValueToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/JavaBeanParser.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/KeyToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/CollectionStartEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/ScalarEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/emitter/ScalarAnalysis.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/Event.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/JavaBeanDumper.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/CollectionEndEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/DocumentEndEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/util/ArrayStack.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/events/StreamEndEvent.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/DumperOptions.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/scanner/ScannerException.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/nodes/NodeTuple.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-jar/org/yaml/snakeyaml/tokens/FlowMappingStartToken.java

* /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-

jar/org/yaml/snakeyaml/events/MappingStartEvent.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/representer/BaseRepresenter.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/events/SequenceEndEvent.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/scanner/ScannerImpl.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/nodes/MappingNode.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/nodes/ScalarNode.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/nodes/CollectionNode.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/nodes/Tag.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/events/DocumentStartEvent.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/nodes/NodeId.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/constructor/CustomClassLoaderConstructor.java

 * /opt/ws_local/PERMITS_SQL/1018976840_1591906891.29/0/snakeyaml-1-6-sources-
jar/org/yaml/snakeyaml/tokens/StreamStartToken.java

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jar/org/yaml/snakeyaml/representer/Representer.java

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jar/org/yaml/snakeyaml/scanner/Constant.java

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jar/org/yaml/snakeyaml/reader/ReaderException.java

1.187 compiler-com-github-spullara-mustache-java-compiler 0.9.10

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1.188 netty-project 4.1.49.Final

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jar/org/jutils/jhardware/info/network/windows/WindowsNetworkInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/network/AbstractNetworkInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/bios/AbstractBiosInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/processor/AbstractProcessorInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/processor/windows/WindowsProcessorInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/OSInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/memory/windows/WindowsMemoryInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/MemoryInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/motherboard/windows/WindowsMotherboardInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/bios/unix/UnixBiosInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/ProcessorInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/HardwareFactory.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/network/unix/UnixNetworkInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/HardwareInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/display/unix/UnixDisplayInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/DisplayInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/util/HardwareInfoUtils.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/display/windows/WindowsDisplayInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/InfoType.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/memory/unix/UnixMemoryInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/info/processor/unix/UnixProcessorInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/MotherboardInfo.java

* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/ComponentInfo.java

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jar/org/jutils/jhardware/info/graphicscard/AbstractGraphicsCardInfo.java
* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-
jar/org/jutils/jhardware/util/TemperatureUtils.java
* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-
jar/org/jutils/jhardware/info/graphicscard/windows/WindowsGraphicsCardInfo.java
* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-
jar/org/jutils/jhardware/info/graphicscard/unix/UnixGraphicsCardInfo.java
* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-
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* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/model/NetworkInterfaceInfo.java
* /opt/cola/permits/1354023097_1658980313.4866261/0/jhardware-0-8-6-sources-jar/org/jutils/jhardware/util/DirectXInfoLoader.java

1.200 jackson-jaxrs 2.10.3
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It was originally written by Tatu Saloranta (tatu.saloranta@iki.fi), and has

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1.201 assertj-fluent-assertions 3.9.1

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* Base class for all implementations of assertions for {@link File}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
*
* @author David DIDIER
* @author Yvonne Wang
* @author Alex Ruiz

* @author Olivier Michallat
* @author Olivier Demeijer
* @author Mikhail Mazursky
* @author Jean-Christophe Gay
*/

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/**
* Base class for all implementations of assertions for {@link Map}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ACTUAL> the type of the "actual" value.
* @param <K> the type of keys in the map.
* @param <V> the type of values in the map.
*
* @author David DIDIER
* @author Yvonne Wang
* @author Alex Ruiz
* @author Mikhail Mazursky
* @author Nicolas François
* @author dorzey
*/

Found in path(s):
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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/**
* Base class for all implementations of assertions for {@link Short}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
*
* @author Drummond Dawson
* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
* @author Alex Ruiz
* @author Mikhail Mazursky
* @author Nicolas François
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Found in path(s):
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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/**

* Base class for all implementations of assertions for {@link Object}s.

*

* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"

*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API

implementation"

*   for more details.

* @param <ACTUAL> the type of the "actual" value.

*

* @author Yvonne Wang

* @author Alex Ruiz

* @author Nicolas François

* @author Mikhail Mazursky

* @author Joel Costigliola

* @author Libor Ondrusek

*/

Found in path(s):

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/**

* Base class for all implementations of assertions for {@link InputStream}s.

* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"

*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API

implementation"

*   for more details.

* @param <ACTUAL> the type of the "actual" value.

*

* @author Matthieu Baechler
* @author Mikhail Mazursky
*/

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/**
* Base class for all implementations of assertions for {@link List}s.
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ACTUAL> the type of the "actual" value.
* @param <ELEMENT> the type of elements of the "actual" value.
* @param <ELEMENT_ASSERT> used for navigational assertions to return the right assert type.
*
* @author Yvonne Wang
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky
*/

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/**

* Base class for all implementations of assertions for {@link Character}s.

*

* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"

*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API

implementation"

*   for more details.

*

* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky

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/**

* Base class for all implementations of assertions for {@link Boolean}s.

*

* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
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*
* @author Alex Ruiz
* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
* @author Mikhail Mazursky
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/**
* Base class for all implementations of assertions for {@link Float}s.
*
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*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
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*
* @author Drummond Dawson
* @author Yvonne Wang
* @author Alex Ruiz
* @author Ansgar Konermann
* @author Mikhail Mazursky
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/**
* Base class for all implementations of assertions for {@link Long}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
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* @author Drummond Dawson
* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
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* Base class for all implementations of assertions for {@link Integer}s.
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*
* @author Drummond Dawson
* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/internal/InputStreamsException.java
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/util/diff/Patch.java
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldNotMatch.java
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/future/Warning.java
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/util/ArrayWrapperList.java
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/error/ErrorMessageFactory.java
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/error/ShouldHaveCauseExactlyInstance.java
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/error/ShouldBeInterface.java
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/error/ShouldBeBeforeYear.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/uri/ShouldHaveFragment.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldNotHave.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/ArraySortedAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldBeAtIndex.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ElementsShouldBeAtMost.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AbstractMapSizeAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/BasicErrorMessageFactory.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldBeEqualWithinOffset.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/presentation/NumberGrouping.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/future/ShouldBeCompleted.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AbstractDoubleArrayAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AbstractOptionalAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldHaveNoCause.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/internal/Bytes.java

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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldHaveSameClass.java

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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AtomicMarkableReferenceAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AbstractPredicateAssert.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldBeLessOrEqual.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldBeEmpty.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/error/ShouldBeEqualWithTimePrecision.java

* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-jar/org/assertj/core/api/AbstractLocalDateAssert.java

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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
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/**
* Base class for all implementations of assertions for {@code CharSequence}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ACTUAL> the type of the "actual" value.
*
* @author Yvonne Wang
* @author David DIDIER
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky
* @author Nicolas Francois

* @author Daniel Weber
*/

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*/
/**
* Assertions methods applicable to groups of objects (e.g. arrays or collections.)
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ELEMENT> the type of elements of the "actual" value.
*
* @author Yvonne Wang
* @author Alex Ruiz
* @author Nicolas François
* @author Mikhail Mazursky
* @author Joel Costigliola
* @author Nicolas François
* @author Florent Biville
*/

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*/
/**
* Base class for all implementations of assertions for {@link Class}es.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
*
* @author William Delanoue
* @author Mikhail Mazursky
*/

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/**
* Base class for all implementations of assertions for {@link BigDecimal}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"

```
*       for more details.
*
* @author Drummond Dawson
* @author David DIDIER
* @author Ted M. Young
* @author Yvonne Wang
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky
*/
```

Found in path(s):
* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/api/AbstractBigDecimalAssert.java
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/**
* Base class for implementations of <code>{@link ObjectEnumerableAssert}</code> whose actual value type is
* <code>{@link Collection}</code>.
*
* @param <SELF> the "self" type of this assertion class. Please read &quot;<a href="http://bit.ly/1IZIRcY"
*       target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation</a>&quot;
*       for more details.
* @param <ACTUAL> the type of the "actual" value.
* @param <ELEMENT> the type of elements of the "actual" value.
* @param <ELEMENT_ASSERT> used for navigational assertions to return the right assert type.
*
* @author Yvonne Wang
* @author Alex Ruiz
* @author Mathieu Baechler
* @author Joel Costigliola
* @author Maciej Jaskowski
* @author Nicolas François
```

* @author Mikhail Mazursky
* @author Mateusz Haligowski
* @author Lovro Pandzic
* @author Marko Bekhta
*/

Found in path(s):
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/**
* Base class for all implementations of assertions for {@link Double}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
*
* @author Drummond Dawson
* @author Yvonne Wang
* @author David DIDIER
* @author Alex Ruiz
* @author Ansgar Konermann
* @author Joel Costigliola
* @author Mikhail Mazursky
* @author Nicolas François
*/

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/**
* Base class for all assertions.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ACTUAL> the type of the "actual" value.
*
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky
* @author Nicolas François
*/

Found in path(s):
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/**
 * Base class for all implementations of assertions for {@link Date}s.
 * <p>
 * Note that assertions with date parameter comes with two flavor, one is obviously a {@link Date} and the other is a
 * {@link String} representing a Date.
 * For the latter, the default format follows ISO 8901 : "yyyy-MM-dd", user can override it with a custom format by
 * calling {@link #withDateFormat(DateFormat)}.
 * The user custom format will then be used for all next Date assertions (i.e not limited to the current assertion) in
 * the test suite.
 * To turn back to default format, simply call {@link #withDefaultDateFormatsOnly()}.
 *
 * @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
 *   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API implementation" for
 *   more details.
 * @author Tomasz Nurkiewicz (thanks for giving assertions idea)
 * @author Joel Costigliola
 * @author Mikhail Mazursky
 * @author William Delanoue
 * @author Michal Kordas
 */

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jar/org/assertj/core/api/AbstractDateAssert.java
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/**
 * Base class for all implementations of assertions for {@link Byte}s.
 *
 * @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
 *   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
 *   for more details.
 *

* @author Drummond Dawson
* @author Yvonne Wang
* @author David DIDIER
* @author Ansgar Konermann
* @author Alex Ruiz
* @author Mikhail Mazursky
* @author Nicolas François
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/**
* Base class for all implementations of assertions for {@link Throwable}s.
*
* @param <SELF> the "self" type of this assertion class. Please read "<a href="http://bit.ly/1IZIRcY"
*   target="_blank">Emulating 'self types' using Java Generics to simplify fluent API
implementation"
*   for more details.
* @param <ACTUAL> the type of the "actual" value.
*
* @author David DIDIER
* @author Alex Ruiz
* @author Joel Costigliola
* @author Mikhail Mazursky
*/

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* /opt/cola/permits/1145434007_1649202262.68/0/assertj-core-3-9-1-sources-
jar/org/assertj/core/api/AbstractThrowableAssert.java

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Rev. April, 2006

Sun/Final/Full

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1.204 zt-process 1.3

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1.209 jackson-core 2.8.1

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1.211 metrics-integration-for-jdbi 4.0.2

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1.212 auto-service 1.0-rc2

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jar/com/google/auto/service/processor/package-info.java

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jar/com/google/auto/service/AutoService.java

* /opt/cola/permits/1354022706_1656537331.553587/0/auto-service-1-0-rc2-sources-1-
jar/com/google/auto/service/processor/AutoServiceProcessor.java

* /opt/cola/permits/1354022706_1656537331.553587/0/auto-service-1-0-rc2-sources-1-jar/com/google/auto/service/processor/ServicesFiles.java

1.213 kotlin-stdlib-jre8 1.2.40
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* /opt/cola/permits/1354023205_1656537185.0117805/0/kotlin-stdlib-jre8-1-2-40-sources-jar/kotlin/collections/Collections.kt
* /opt/cola/permits/1354023205_1656537185.0117805/0/kotlin-stdlib-jre8-1-2-40-sources-jar/kotlin/text/RegexExtensions.kt
* /opt/cola/permits/1354023205_1656537185.0117805/0/kotlin-stdlib-jre8-1-2-40-sources-jar/kotlin/streams/Streams.kt

1.214 guava-listenablefuture-only 9999.0-empty-to-avoid-conflict-with-guava
1.214.1 Available under license :

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1.215 guava-retrying 2.0.0

1.216 protobuf-java 3.10.0

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jar/com/google/protobuf/NewInstanceSchemas.java

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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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jar/google/protobuf/compiler/plugin.proto

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jar/com/google/protobuf/AbstractMessage.java

* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-jar/google/protobuf/wrappers.proto

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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-

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* /opt/cola/permits/1492060754_1669828169.9190915/0/protobuf-java-3-10-0-sources-2-
jar/com/google/protobuf/ExperimentalApi.java

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jar/google/protobuf/timestamp.proto

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jar/com/google/protobuf/RpcChannel.java

1.217 apache-httpcomponents-core 4.4.4

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1.220 metrics-integration-for-apache-httpasyncclient 3.2.5

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Manifest-Version: 1.0

Bnd-LastModified: 1505464763109

Build-Jdk: 1.8.0_131

Built-By: artem

Bundle-Description: An Apache HttpAsyncClient wrapper providing Metrics

instrumentation of connection pools, request   durations and rates

, and other useful information.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Integration for Apache HttpAsyncClient

Bundle-SymbolicName: io.dropwizard.metrics.httpasyncclient

Bundle-Version: 3.2.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.httpasyncclient;uses:="org.apache.h

ttp.nio.conn,org.apache.http.config,com.codahale.metrics,org.apache.htt

p.nio.reactor,org.apache.http.pool,org.apache.http.conn,org.apache.http

.impl.nio.conn,org.apache.http.impl.nio.client,org.apache.http.nio.prot

ocol,org.apache.http.concurrent,org.apache.http.protocol,org.apache.htt

p,com.codahale.metrics.httpclient";version="3.2.5"

Implementation-Title: Metrics Integration for Apache HttpAsyncClient

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 3.2.5

Import-Package: com.codahale.metrics;version="[3.2,4)",com.codahale.metr

ics.httpclient;version="[3.2,4)",org.apache.http,org.apache.http.concur

rent,org.apache.http.config,org.apache.http.conn,org.apache.http.impl.n

io.client,org.apache.http.impl.nio.conn,org.apache.http.nio.conn,org.ap

ache.http.nio.protocol,org.apache.http.nio.reactor,org.apache.http.pool

,org.apache.http.protocol

Tool: Bnd-1.50.0

Found in path(s):

* /opt/cola/permits/1274704149_1655257274.9345021/0/metrics-httpasyncclient-3-2-5-jar/META-
INF/MANIFEST.MF

1.221 dropwizard-jersey-support 1.3.23

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1.222 jackson-annotations 2.8.0

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1.223 apache-commons-cli 1.2

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* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/annotation/ClassMemberValue.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/annotation/ArrayMemberValue.java
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jar/javassist/bytecode/annotation/IntegerMemberValue.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/annotation/CharMemberValue.java
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jar/javassist/bytecode/annotation/DoubleMemberValue.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/annotation/BooleanMemberValue.java
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* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/scopedpool/ScopedClassPool.java
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jar/javassist/compiler/ProceedHandler.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/compiler/ast/FieldDecl.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/compiler/KeywordTable.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/compiler/ast/AssignExpr.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/compiler/ast/CondExpr.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/ExceptionsAttribute.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-
jar/javassist/bytecode/ByteArray.java
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* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/CtNewConstructor.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/CannotCompileException.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/ast/Stmnt.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/util/proxy/MethodFilter.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/scopedpool/SoftValueHashMap.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/web/Webserver.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/ast/Pair.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/CtClassType.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/reflect/CannotInvokeException.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/convert/TransformAfter.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/ExceptionTable.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/analysis/Type.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/convert/TransformReadField.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/util/proxy/Proxy.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/ast/StringL.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/ClassPool.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/analysis/SubroutineScanner.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/LocalVariableTypeAttribute.java
* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-

jar/javassist/compiler/ast/MethodDecl.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/AccessorMaker.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/convert/Transformer.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/ast/Member.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/scopedpool/ScopedClassPoolRepositoryImpl.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/rmi/Proxy.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/SourceFileAttribute.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/runtime/Desc.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/CtNewWrappedConstructor.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/SyntaxError.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/reflect/Metaobject.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/LoaderClassPath.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/compiler/ast/Expr.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/rmi/StubGenerator.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/runtime/Cflow.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/web/BadHttpRequest.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/convert/TransformBefore.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/util/HotSwapper.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/util/proxy/SecurityActions.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/CtNewMethod.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/AccessFlag.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/bytecode/LineNumberAttribute.java

* /opt/cola/permits/1330679828_1653003184.8070118/0/javassist-3-18-1-ga-sources-jar/javassist/tools/rmi/RemoteException.java

1.225 jackson-xc 2.10.2

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1.226 pact-jvm-provider_2.12 3.5.17

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that what they have is not the original version, so that the original
author's reputation will not be affected by problems that might be
introduced by others.

 Finally, software patents pose a constant threat to the existence of
any free program. We wish to make sure that a company cannot
effectively restrict the users of a free program by obtaining a
restrictive license from a patent holder. Therefore, we insist that

any patent license obtained for a version of the library must be
consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the
ordinary GNU General Public License. This license, the GNU Lesser
General Public License, applies to certain designated libraries, and
is quite different from the ordinary General Public License. We use
this license for certain libraries in order to permit linking those
libraries into non-free programs.

When a program is linked with a library, whether statically or using
a shared library, the combination of the two is legally speaking a
combined work, a derivative of the original library. The ordinary
General Public License therefore permits such linking only if the
entire combination fits its criteria of freedom. The Lesser General
Public License permits more lax criteria for linking other code with
the library.

We call this license the "Lesser" General Public License because it
does Less to protect the user's freedom than the ordinary General
Public License. It also provides other free software developers Less
of an advantage over competing non-free programs. These disadvantages
are the reason we use the ordinary General Public License for many
libraries. However, the Lesser license provides advantages in certain
special circumstances.

For example, on rare occasions, there may be a special need to
encourage the widest possible use of a certain library, so that it becomes
a de-facto standard. To achieve this, non-free programs must be
allowed to use the library. A more frequent case is that a free
library does the same job as widely used non-free libraries. In this
case, there is little to gain by limiting the free library to free
software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free
programs enables a greater number of people to use a large body of
free software. For example, permission to use the GNU C Library in
non-free programs enables many more people to use the whole GNU
operating system, as well as its variant, the GNU/Linux operating
system.

Although the Lesser General Public License is Less protective of the
users' freedom, it does ensure that the user of a program that is
linked with the Library has the freedom and the wherewithal to run
that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and
modification follow. Pay close attention to the difference between a

"work based on the library" and a "work that uses the library". The
former contains code derived from the library, whereas the latter must
be combined with the library in order to run.

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 A "library" means a collection of software functions and/or data
prepared so as to be conveniently linked with application programs
(which use some of those functions and data) to form executables.

 The "Library", below, refers to any such software library or work
which has been distributed under these terms. A "work based on the
Library" means either the Library or any derivative work under
copyright law: that is to say, a work containing the Library or a
portion of it, either verbatim or with modifications and/or translated
straightforwardly into another language. (Hereinafter, translation is
included without limitation in the term "modification".)

 "Source code" for a work means the preferred form of the work for
making modifications to it. For a library, complete source code means
all the source code for all modules it contains, plus any associated
interface definition files, plus the scripts used to control compilation
and installation of the library.

 Activities other than copying, distribution and modification are not
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running a program using the Library is not restricted, and output from
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on the Library (independent of the use of the Library in a tool for
writing it). Whether that is true depends on what the Library does
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  b) You must cause the files modified to carry prominent notices
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  c) You must cause the whole of the work to be licensed at no
  charge to all third parties under the terms of this License.

  d) If a facility in the modified Library refers to a function or a
  table of data to be supplied by an application program that uses
  the facility, other than as an argument passed when the facility
  is invoked, then you must make a good faith effort to ensure that,
  in the event an application does not supply such function or
  table, the facility still operates, and performs whatever part of
  its purpose remains meaningful.

  (For example, a function in a library to compute square roots has
  a purpose that is entirely well-defined independent of the
  application. Therefore, Subsection 2d requires that any
  application-supplied function or table used by this function must
  be optional: if the application does not supply it, the square
  root function must still compute square roots.)

These requirements apply to the modified work as a whole. If
identifiable sections of that work are not derived from the Library,
and can be reasonably considered independent and separate works in
themselves, then this License, and its terms, do not apply to those
sections when you distribute them as separate works. But when you
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on the Library, the distribution of the whole must be on the terms of
this License, whose permissions for other licensees extend to the
entire whole, and thus to each and every part regardless of who wrote
it.

Thus, it is not the intent of this section to claim rights or contest
your rights to work written entirely by you; rather, the intent is to
exercise the right to control the distribution of derivative or
collective works based on the Library.

In addition, mere aggregation of another work not based on the Library
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License instead of this License to a given copy of the Library. To do
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that they refer to the ordinary GNU General Public License, version 2,
instead of to this License. (If a newer version than version 2 of the
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that version instead if you wish.) Do not make any other change in
these notices.

 Once this change is made in a given copy, it is irreversible for
that copy, so the ordinary GNU General Public License applies to all
subsequent copies and derivative works made from that copy.

 This option is useful when you wish to copy part of the code of
the Library into a program that is not a library.

 4. You may copy and distribute the Library (or a portion or
derivative of it, under Section 2) in object code or executable form
under the terms of Sections 1 and 2 above provided that you accompany
it with the complete corresponding machine-readable source code, which
must be distributed under the terms of Sections 1 and 2 above on a
medium customarily used for software interchange.

 If distribution of object code is made by offering access to copy
from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

 5. A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a "work that uses the Library". Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

 However, linking a "work that uses the Library" with the Library
creates an executable that is a derivative of the Library (because it
contains portions of the Library), rather than a "work that uses the
library". The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the

Library. A suitable mechanism is one that (1) uses at run time a
copy of the library already present on the user's computer system,
rather than copying library functions into the executable, and (2)
will operate properly with a modified version of the library, if
the user installs one, as long as the modified version is
interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at
least three years, to give the same user the materials
specified in Subsection 6a, above, for a charge no more
than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy
from a designated place, offer equivalent access to copy the above
specified materials from the same place.

e) Verify that the user has already received a copy of these
materials or that you have already sent this user a copy.

 For an executable, the required form of the "work that uses the
Library" must include any data and utility programs needed for
reproducing the executable from it. However, as a special exception,
the materials to be distributed need not include anything that is
normally distributed (in either source or binary form) with the major
components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies
the executable.

 It may happen that this requirement contradicts the license
restrictions of other proprietary libraries that do not normally
accompany the operating system. Such a contradiction means you cannot
use both them and the Library together in an executable that you
distribute.

 7. You may place library facilities that are a work based on the
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the Library and of the other library facilities is otherwise
permitted, and provided that you do these two things:

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complete object files to the recipients, so that they can relink them
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 If such an object file uses only numerical parameters, data
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1.229 kotlin-stdlib-jre7 1.2.40

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* /opt/cola/permits/1162865425_1649200933.51/0/optional-0-3-sources-jar/org/dmfs/optional/iter/OptIter.java

1.231 grizzly-framework 2.3.28

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1.232 slf4j-simple-binding 1.8.0-beta4

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1.233 json-java 20080701

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jar/org/json/XMLTokener.java
* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-
jar/org/json/HTTPTokener.java
* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-
jar/org/json/JSONTokener.java
* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-
jar/org/json/XML.java
* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-
jar/org/json/CookieList.java
* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-

jar/org/json/CDL.java

* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-jar/org/json/JSONObject.java

* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-jar/org/json/Cookie.java

* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-jar/org/json/JSONArray.java

* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-jar/org/json/HTTP.java

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* /opt/cola/permits/1020251895_1611190176.5/0/json-20080701-sources-jar-zip/json-20080701-sources-jar/org/json/JSONStringer.java

1.234 apache-commons-math 3.4

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The initial code for shuffling an array (originally in class
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a method in class "org.apache.commons.math3.util.MathArrays") was
inspired from the algorithm description provided in
"Algorithms", by Ian Craw and John Pulham (University of Aberdeen 1999).
The textbook (containing a proof that the shuffle is uniformly random) is
available here:
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jar/dk/brics/automaton/ShuffleOperations.java
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jar/dk/brics/automaton/RunAutomaton.java
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---

core/src/java/org/apache/lucene/util/compress/LZ4.java is a Java
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analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
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analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
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analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
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 http://jaist.dl.sourceforge.net/project/mecab/mecab-ipadic/2.7.0-20070801/mecab-ipadic-2.7.0-20070801.tar.gz

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* /opt/cola/permits/1274704929_1650660403.58/0/slf4j-api-1-8-0-beta4-sources-jar/org/slf4j/spi/MarkerFactoryBinder.java
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* /opt/cola/permits/1274704929_1650660403.58/0/slf4j-api-1-8-0-beta4-sources-jar/org/slf4j/helpers/NOPLogger.java
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* /opt/cola/permits/1274704929_1650660403.58/0/slf4j-api-1-8-0-beta4-sources-jar/org/slf4j/helpers/MarkerIgnoringBase.java
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1.239 junixsocket-native-common 2.0.4

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* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-jar/org/hibernate/validator/cfg/defs/br/package.html
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-jar/org/hibernate/validator/internal/cfg/context/package.html
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jar/org/hibernate/validator/constraints/Mod11Check.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/size/SizeValidatorForArraysOfLong.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/annotationfactory/AnnotationFactory.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/constraintvalidation/ConstraintViolationCreationContext.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/logging/LoggerFactory.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/messageinterpolation/parser/Token.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/ValidatorImpl.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/cfg/defs/pl/PESELDef.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/valuehandling/JavaFXPropertyValueUnwrapper.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/cfg/context/MethodConstraintMappingContextImpl.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/cfg/defs/ScriptAssertDef.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/cfg/context/CascadableConstraintMappingContextImplBase.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/time/DefaultTimeProvider.java

* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-

jar/org/hibernate/validator/internal/util/privilegedactions/GetMethods.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/privilegedactions/GetDeclaredMethods.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/hv/ParameterScriptAssertValidator.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/constraints/br/TituloEleitoral.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/size/SizeValidatorForArraysOfDouble.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/money/MaxValidatorForMonetaryAmount.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/cfg/defs/pl/REGONDef.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/MinValidatorForNumber.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/metadata/descriptor/BeanDescriptorImpl.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/spi/time/TimeProvider.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/MessageInterpolatorContext.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/metadata/aggregated/rule/ReturnValueMayOnlyBeMarkedOnceAsCascadedPerH
ierarchyLine.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/constraints/EAN.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/metadata/core/ConstraintOrigin.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/constraints/ConstraintComposition.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/hv/ModCheckValidator.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/metadata/aggregated/PropertyMetaData.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/engine/groups/GroupWithInheritance.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/cfg/defs/EANDef.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/scriptengine/ScriptEvaluatorFactory.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/logging/formatter/CollectionOfObjectsToStringFormatter.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/DecimalMinValidatorForNumber.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/constraintvalidators/bv/money/DecimalMinValidatorForMonetaryAmount.java
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/stereotypes/Immutable.java

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```
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*
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*/
/**
 * Retrieves constraint related meta data for the parameters of the given
 * executable.
 *
 * @param executable The executable of interest.
 *
 * @return A list with parameter meta data for the given executable.
 */
```

Found in path(s):
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/metadata/provider/AnnotationMetaDataProvider.java
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jar/org/hibernate/validator/internal/util/TypeHelper.java
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```
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```

```
*/
/*
* Written by Doug Lea with assistance from members of JCP JSR-166
* Expert Group and released to the public domain, as explained at
* http://creativecommons.org/licenses/publicdomain
*/
```

Found in path(s):
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-
jar/org/hibernate/validator/internal/util/ConcurrentReferenceHashMap.java
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```
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*
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*/
/**
* <p>
* A method-level constraint, that evaluates a script expression against the
* annotated method or constructor. This constraint can be used to implement
* validation routines that depend on several parameters of the annotated
* executable.
* </p>
* <p>
* Script expressions can be written in any scripting or expression language,
* for which a <a href="http://jcp.org/en/jsr/detail?id=223">JSR 223</a>
* ("Scripting for the Java<sup>TM</sup> Platform") compatible engine can be
* found on the classpath. To refer to a parameter within the scripting
* expression, use its name as obtained by the active
* {@link javax.validation.ParameterNameProvider}. By default, {@code arg0}, {@code arg1} etc.
* will be used as parameter names.
* </p>
* <p>
* The following listing shows an example using the JavaScript engine which
* comes with the JDK:
* </p>
* <pre>
* {@code @ParameterScriptAssert(script = "arg0.before(arg1)", lang = "javascript")
* public void createEvent(Date start, Date end) { ... }
* }
* </pre>
* <p>
* Can be specified on any method or constructor.
* </p>
*
* @author Gunnar Morling
```

```
                    */
```

Found in path(s):
* /opt/cola/permits/1110784492_1606854022.08/0/hibernate-validator-5-4-2-final-sources-3-jar/org/hibernate/validator/constraints/ParameterScriptAssert.java

1.242 jboss-logging 3.4.1.Final

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1.244 jvm-integration-for-metrics 4.0.5

1.244.1 Available under license :

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Manifest-Version: 1.0

Bnd-LastModified: 1545937890888

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: A set of classes which allow you to monitor critic

al aspects of your Java Virtual Machine   using Metrics.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: JVM Integration for Metrics

Bundle-SymbolicName: io.dropwizard.metrics.jvm

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.jvm;uses:="com.codahale.metrics,j

avax.management";version="4.0.5"

Implementation-Title: JVM Integration for Metrics

Implementation-URL: http://metrics.dropwizard.io/metrics-jvm

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: org.slf4j;version="[1.6.0,2.0.0)",com.sun.management;r

esolution:=optional,com.codahale.metrics;version="[4.0,5)",javax.mana

gement

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274701574_1648835908.24/0/metrics-jvm-4-0-5-jar/META-INF/MANIFEST.MF

1.245 archaius-core 0.7.1

1.245.1 Available under license :

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Found in path(s):

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/WatchedUpdateResult.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/AbstractDynamicPropertyListener.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicStringListProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicBooleanProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/samples/SampleApplicationWithDefaultConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/sources/JDBCConfigurationSource.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/PolledConfigurationSource.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/ExpandedConfigurationListenerAdapter.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/PollResult.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/WatchedConfigurationSource.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/PollListener.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/PropertyListener.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/MissingConfigurationSourceException.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicPropertyFactory.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/AggregatedConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicSetProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/jmx/ConfigMBean.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/validation/PropertyChangeValidator.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicDoubleProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/validation/ValidationException.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/DynamicStringMapProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/com/netflix/config/util/HttpVerbUriRegexPropertyValue.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-

jar/com/netflix/config/ConcurrentCompositeConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ConfigurationManager.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/sources/URLConfigurationSource.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/PropertyWrapper.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ConfigurationWithPollingSource.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DefaultContextualPredicate.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicContextualProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/AbstractPollingScheduler.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/FixedDelayPollingScheduler.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/StringDerivedProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicLongProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicPropertyUpdater.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ChainedDynamicProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicListProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicMapProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ClasspathPropertiesConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/util/ConfigurationUtils.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/samples/SampleApplication.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/WatchedUpdateListener.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicURLConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/jmx/BaseConfigMBean.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicStringProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicFloatProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-

jar/com/netflix/config/DynamicIntProperty.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/SimpleDeploymentContext.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DeploymentContext.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ConfigurationBackedDynamicPropertySupportImpl.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicWatchedConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/jmx/ConfigJMXManager.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/WebApplicationProperties.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ConfigurationBasedDeploymentContext.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/ConcurrentMapConfiguration.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicPropertySupport.java

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DerivedStringProperty.java

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* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-jar/sampleapp.properties
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*

*/

Found in path(s):

* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/Property.java

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* /opt/cola/permits/1343907377_1655169478.939914/0/archaius-core-0-7-1-sources-1-
jar/com/netflix/config/DynamicStringSetProperty.java

1.246 antlr 4.6

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```
tree grammar BlockSetTransformer;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
 output   = AST;
 filter   = true;
}

@header {
package org.antlr.v4.parse;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.List;
import java.util.Set;
import java.util.HashSet;
import java.util.ArrayList;
import org.antlr.v4.runtime.misc.IntervalSet;
}

@members {
public String currentRuleName;
public GrammarAST currentAlt;
public Grammar g;
public BlockSetTransformer(TreeNodeStream input, Grammar g) {
  this(input, new RecognizerSharedState());
  this.g = g;
}
```

```
        }

        topdown
          : ^(RULE (id=TOKEN_REF|id=RULE_REF) {currentRuleName=$id.text;} .+)
          | setAlt
          | ebnfBlockSet
          | blockSet
        ;

        setAlt
         : {inContext("RULE BLOCK")}?
          ALT {currentAlt = $start;}
         ;

        // (BLOCK (ALT (+ (BLOCK (ALT INT) (ALT ID)))))
        ebnfBlockSet
        @after {
         GrammarTransformPipeline.setGrammarPtr(g, $tree);
        }
         : ^(ebnfSuffix blockSet) -> ^(ebnfSuffix ^(BLOCK<BlockAST> ^(ALT<AltAST> blockSet)))
         ;

        ebnfSuffix
        @after {$tree = (GrammarAST)adaptor.dupNode($start);}
         : OPTIONAL
          | CLOSURE
           | POSITIVE_CLOSURE
         ;

        blockSet
        @init {
        boolean inLexer = Grammar.isTokenName(currentRuleName);
        }
        @after {
         GrammarTransformPipeline.setGrammarPtr(g, $tree);
        }
         : {inContext("RULE")}? // top-level: rule block and > 1 alt
          ^(BLOCK ^(alt=ALT elementOptions? {((AltAST)$alt).altLabel==null}? setElement[inLexer]) ( ^(ALT
        elementOptions? setElement[inLexer]) )+)
          -> ^(BLOCK<BlockAST>[$BLOCK.token] ^(ALT<AltAST>[$BLOCK.token,"ALT"] ^(SET[$BLOCK.token,
        "SET"] setElement+)))
         | {!inContext("RULE")}? // if not rule block and > 1 alt
          ^(BLOCK ^(ALT elementOptions? setElement[inLexer]) ( ^(ALT elementOptions? setElement[inLexer]) )+)
          -> ^(SET[$BLOCK.token, "SET"] setElement+)
         ;

        setElement[boolean inLexer]
        @after {
```

```
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ( ^(a=STRING_LITERAL elementOptions) {!inLexer ||
CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  | a=STRING_LITERAL {!inLexer || CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  | {!inLexer}?=> ^(TOKEN_REF elementOptions)
  | {!inLexer}?=>  TOKEN_REF
  | {inLexer}?=> ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   {CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1 &&
    CharSupport.getCharValueFromGrammarCharLiteral($b.getText())!=-1}?
  )
 ;


elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;


elementOption
 : ID
 | ^(ASSIGN id=ID v=ID)
 | ^(ASSIGN ID v=STRING_LITERAL)
 | ^(ASSIGN ID v=ACTION)
 | ^(ASSIGN ID v=INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/BlockSetTransformer.g
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*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/messages/formats/vs2005.stg
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Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/Cpp/Cpp.stg
No license file was found, but licenses were detected in source scan.

tree grammar ATNBuilder;
options {
 language   = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;

```
//  filter      = true;
}

// Include the copyright in this source and also the generated source
@header {
/*
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*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import org.antlr.v4.automata.ATNFactory;
}

@members {
  ATNFactory factory;
  public ATNBuilder(TreeNodeStream input, ATNFactory factory) {
   this(input);
   this.factory = factory;
  }
}

dummy : block[null] ; // avoid error about no start rule

ruleBlock[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {
```

```
        List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();
        int alt = 1;
        factory.setCurrentOuterAlt(alt);
    }
    : ^(BLOCK
        (^(OPTIONS .*))?
        (   a=alternative
            {alts.add($a.p); factory.setCurrentOuterAlt(++alt);}
        )+
      )
    {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
    ;


block[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();}
    : ^(BLOCK (^(OPTIONS .*))? (a=alternative {alts.add($a.p);})+)
    {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
    ;


alternative returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> els = new ArrayList<ATNFactory.Handle>();}
    : ^(LEXER_ALT_ACTION a=alternative lexerCommands)
        {$p = factory.lexerAltCommands($a.p,$lexerCommands.p);}
    | ^(ALT elementOptions? EPSILON)      {$p = factory.epsilon($EPSILON);}
    |  ^(ALT elementOptions? (e=element {els.add($e.p);})+) {$p = factory.alt(els);}
    ;


lexerCommands returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> cmds = new ArrayList<ATNFactory.Handle>();}
    : (c=lexerCommand {if ($c.cmd != null) cmds.add($c.cmd);})+
        {
        $p = factory.alt(cmds);
        }
    ;


lexerCommand returns [ATNFactory.Handle cmd]
    : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
        {$cmd = factory.lexerCallCommand($ID, $lexerCommandExpr.start);}
    | ID
        {$cmd = factory.lexerCommand($ID);}
    ;


lexerCommandExpr
    : ID
    | INT
    ;


element returns [ATNFactory.Handle p]
```

```
 : labeledElement    {$p = $labeledElement.p;}
 | atom       {$p = $atom.p;}
 | subrule      {$p = $subrule.p;}
 |  ACTION       {$p = factory.action((ActionAST)$ACTION);}
 |  SEMPRED     {$p = factory.sempred((PredAST)$SEMPRED);}
 |  ^(ACTION .)    {$p = factory.action((ActionAST)$ACTION);}
 |  ^(SEMPRED .)    {$p = factory.sempred((PredAST)$SEMPRED);}
  | ^(NOT b=blockSet[true])  {$p = $b.p;}
  | LEXER_CHAR_SET     {$p = factory.charSetLiteral($start);}
 ;

astOperand returns [ATNFactory.Handle p]
 : atom      {$p = $atom.p;}
 | ^(NOT blockSet[true])  {$p = $blockSet.p;}
 ;

labeledElement returns [ATNFactory.Handle p]
 : ^(ASSIGN ID element)     {$p = factory.label($element.p);}
 | ^(PLUS_ASSIGN ID element)   {$p = factory.listLabel($element.p);}
 ;

subrule returns [ATNFactory.Handle p]
 : ^(OPTIONAL block[$start])   {$p = $block.p;}
 | ^(CLOSURE block[$start])   {$p = $block.p;}
 | ^(POSITIVE_CLOSURE block[$start]) {$p = $block.p;}
 |  block[null]      {$p = $block.p;}
  ;

blockSet[boolean invert] returns [ATNFactory.Handle p]
@init {List<GrammarAST> alts = new ArrayList<GrammarAST>();}
 : ^(SET (setElement {alts.add($setElement.start);})+) {$p = factory.set($start, alts, $invert);}
 ;

/** Don't combine with atom otherwise it will build spurious ATN nodes */
setElement
 : ^(STRING_LITERAL .)
 | ^(TOKEN_REF .)
 | STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  |  LEXER_CHAR_SET
 ;

atom returns [ATNFactory.Handle p]
 : range     {$p = $range.p;}
 | ^(DOT ID terminal)  {$p = $terminal.p;}
 | ^(DOT ID ruleref)  {$p = $ruleref.p;}
  | ^(WILDCARD .)   {$p = factory.wildcard($start);}
```

```
 | WILDCARD    {$p = factory.wildcard($start);}
 | blockSet[false]   {$p = $blockSet.p;}
 |  terminal    {$p = $terminal.p;}
 |  ruleref    {$p = $ruleref.p;}
 ;

ruleref returns [ATNFactory.Handle p]
 : ^(RULE_REF ARG_ACTION? ^(ELEMENT_OPTIONS .*))  {$p = factory.ruleRef($RULE_REF);}
 | ^(RULE_REF ARG_ACTION?)        {$p = factory.ruleRef($RULE_REF);}
 | RULE_REF         {$p = factory.ruleRef($RULE_REF);}
 ;

range returns [ATNFactory.Handle p]
 : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL) {$p = factory.range($a,$b);}
 ;

terminal returns [ATNFactory.Handle p]
 :  ^(STRING_LITERAL .)   {$p = factory.stringLiteral((TerminalAST)$start);}
 | STRING_LITERAL    {$p = factory.stringLiteral((TerminalAST)$start);}
 | ^(TOKEN_REF ARG_ACTION .) {$p = factory.tokenRef((TerminalAST)$start);}
 | ^(TOKEN_REF .)    {$p = factory.tokenRef((TerminalAST)$start);}
 | TOKEN_REF     {$p = factory.tokenRef((TerminalAST)$start);}
 ;

elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;

elementOption
 : ID
 | ^(ASSIGN ID ID)
 | ^(ASSIGN ID STRING_LITERAL)
 | ^(ASSIGN ID ACTION)
 | ^(ASSIGN ID INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ATNBuilder.g
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 *  Copyright (c) 2012-2016 Terence Parr
 *  Copyright (c) 2012-2016 Sam Harwell
 *  Copyright (c) 2014 Eric Vergnaud
 *  All rights reserved.
 *
 *  Redistribution and use in source and binary forms, with or without
```

```
/** ANTLR tool checks output templates are compatible with tool code generation.
 * For now, a simple string match used on x.y of x.y.z scheme.
 * Must match Tool.VERSION during load to templates.
 *
 * REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
<if(file.genListener)>
var <file.grammarName>Listener = require('./<file.grammarName>Listener').<file.grammarName>Listener;
<endif>
<if(file.genVisitor)>
var <file.grammarName>Visitor = require('./<file.grammarName>Visitor').<file.grammarName>Visitor;
```

```
<endif>

<namedActions.header>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete listener for a parse tree produced by <file.parserName>.
function <file.grammarName>Listener() {
 antlr4.tree.ParseTreeListener.call(this);
 return this;
}

<file.grammarName>Listener.prototype = Object.create(antlr4.tree.ParseTreeListener.prototype);
<file.grammarName>Listener.prototype.constructor = <file.grammarName>Listener;

<file.listenerNames:{lname |
// Enter a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.enter<lname; format="cap"> = function(ctx) {
\};

// Exit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.exit<lname; format="cap"> = function(ctx) {
\};

}; separator="\n">

exports.<file.grammarName>Listener = <file.grammarName>Listener;
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

function <file.grammarName>Visitor() {
 antlr4.tree.ParseTreeVisitor.call(this);
 return this;
}

<file.grammarName>Visitor.prototype = Object.create(antlr4.tree.ParseTreeVisitor.prototype);
<file.grammarName>Visitor.prototype.constructor = <file.grammarName>Visitor;
```

```
<file.visitorNames:{lname |
// Visit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Visitor.prototype.visit<lname; format="cap"> = function(ctx) {
 return this.visitChildren(ctx);
\};

}; separator="\n">

exports.<file.grammarName>Visitor = <file.grammarName>Visitor;
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
// jshint ignore: start
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

var grammarFileName = "<parser.grammarFileName; format="java-escape">";

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

var sharedContextCache = new antlr4.PredictionContextCache();

var literalNames = [ <parser.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

function <parser.name> (input) {
 <superClass; null="antlr4.Parser">.call(this, input);
   this._interp = new antlr4.atn.ParserATNSimulator(this, atn, decisionsToDFA, sharedContextCache);
   this.ruleNames = ruleNames;
   this.literalNames = literalNames;
   this.symbolicNames = symbolicNames;
 <namedActions.members>
   return this;
}
```

```
<parser.name>.prototype = Object.create(<superClass; null="antlr4.Parser">.prototype);
<parser.name>.prototype.constructor = <parser.name>;

Object.defineProperty(<parser.name>.prototype, "atn", {
 get : function() {
  return atn;
 }
});

<parser.name>.EOF = antlr4.Token.EOF;
<if(parser.tokens)>
<parser.tokens:{k | <parser.name>.<k> = <parser.tokens.(k)>;}; separator="\n", wrap, anchor>
<endif>

<parser.rules:{r | <parser.name>.RULE_<r.name> = <r.index>;}; separator="\n", wrap, anchor>

<funcs; separator="\n">

<if(sempredFuncs)>
<parser.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch(ruleIndex) {
 <parser.sempredFuncs.values:{f | case <f.ruleIndex>:
  return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
  default:
     throw "No predicate with index:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>

exports.<parser.name> = <parser.name>;

>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
<lexer.name>.prototype.action = function(localctx, ruleIndex, actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 this.<f.name>_action(localctx, actionIndex);
 break;}; separator="\n">
 default:
  throw "No registered action for:" + ruleIndex;
 }
};
```

```
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
<lexer.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch (ruleIndex) {
  <recog.sempredFuncs.values:{f| case <f.ruleIndex>:
 return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
    throw "No registered predicate for:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

<lexer.name>.prototype.<r.name>_action = function(localctx , actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 default:
  throw "No registered action for:" + actionIndex;
 }
};
>>

/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
<if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>.prototype.<r.name>_sempred = function(localctx,
predIndex) {
 switch(predIndex) {
  <actions:{index| case <index>:
 return <actions.(index)>;}; separator="\n">
  default:
   throw "No predicate with index:" + predIndex;
 }
};
```

```
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<! Define fields of this parser to export the context classes !>
<parser.name>.<currentRule.ctxType> = <currentRule.ctxType>;

<parser.name>.prototype.<currentRule.name> = function(<currentRule.args:{a | <a.name>}; separator=", ">) {

  var localctx = new <currentRule.ctxType>(this, this._ctx, this.state<currentRule.args:{a | , <a.name>}>);
  this.enterRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
     <code>
     <postamble; separator="\n">
     <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  } catch (re) {
   if(re instanceof antlr4.error.RecognitionException) {
      localctx.exception = re;
      this._errHandler.reportError(this, re);
      this._errHandler.recover(this, re);
   } else {
    throw re;
   }
  }<endif> finally {
     <finallyAction>
     this.exitRule();
  }
  return localctx;
};

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
```

```
<parser.name>.prototype.<currentRule.name> = function(_p<if(currentRule.args)>, <args:{a | , <a>}><endif>) {
 if(_p===undefined) {
    _p = 0;
 }
  var _parentctx = this._ctx;
  var _parentState = this.state;
  var localctx = new <currentRule.ctxType>(this, this._ctx, _parentState<args:{a | , <a.name>}>);
  var _prevctx = localctx;
  var _startState = <currentRule.startState>;
  this.enterRecursionRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p);
  <namedActions.init>
  <locals; separator="\n">
  try {
     <code>
     <postamble; separator="\n">
     <namedActions.after>
  } catch( error) {
     if(error instanceof antlr4.error.RecognitionException) {
       localctx.exception = error;
       this._errHandler.reportError(this, error);
       this._errHandler.recover(this, error);
     } else {
      throw error;
     }
  } finally {
     <finallyAction>
     this.unrollRecursionContexts(_parentctx)
  }
  return localctx;
};

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(this, localctx);<endif>
this.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
```

```
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = this._input.LT(1);<endif>
<preamble; separator="\n">
switch(this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  break;}; separator="\n">
default:
  <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
switch (this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
if(<expr>) {
  <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
while(<loopExpr>) {
  <alts; separator="\n">
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
```

```
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
<preamble; separator="\n">
do {
  <alts; separator="\n">
  this.state = <choice.stateNumber>; <! loopback/exit decision !>
  this._errHandler.sync(this);
  <iteration>
} while(<loopExpr>);
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
switch(la_) {
<alts:{alt |
case <i>:
  <alt>
  break;
}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
<alts:{alt |
if(la_===<i><if(!choice.ast.greedy)>+1<endif>) {
  <alt>
}; separator="\n} else ">
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx)
while(_alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER) {
  if(_alt===1<if(!choice.ast.greedy)>+1<endif>) {
    <iteration>
    <alts> <! should only be one !>
  }
```

```
    this.state = <choice.loopBackStateNumber>;
    this._errHandler.sync(this);
    _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
}

>>


PlusBlock(choice, alts, error) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
var _alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 this.state = <choice.loopBackStateNumber>; <! loopback/exit decision !>
 this._errHandler.sync(this);
 _alt = this._interp.adaptivePredict(this._input,<choice.decision>, this._ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "throw new antlr4.error.NoViableAltException(this);"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Javascript language spec - shift operators are 32 bits long max
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x1f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>


isZero ::= [
"0":true,
```

```
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>===<parser.name>.<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <parser.name>.<t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
this.state = <r.stateNumber>;
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>this.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this.match(<parser.name>.<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>this._input.LT(1);<endif>
<capture>
<if(invert)>if(<m.varName>\<=0 || <expr>)<else>if(!(<expr>))<endif> {
    <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this._errHandler.recoverInline(this);
}
else {
 this._errHandler.reportMatch(this);
    this.consume();
}
>>
```

```
Wildcard(w) ::= <<
this.state = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>


// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
this.state = <p.stateNumber>;
if (!( <chunks>)) {
    throw new antlr4.error.FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
}
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>


// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "this.skip()"
LexerMoreCommand()  ::= "this.more()"
LexerPopModeCommand() ::= "this.popMode()"
LexerTypeCommand(arg, grammar)      ::= "this._type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "this._channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "this._mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "this.pushMode(<arg>)"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"
```

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>===null ? null : <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.type)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : parseInt(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r) ::= "(<ctx(r)>.<r.label>===null ? null : this._input.getText(new
antlr4.Interval(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "this._input.getText(new antlr4.Interval(localctx.start, this._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)   ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.push(<labelref(a.label)>);"

TokenDecl(t) ::= "this.<t.name> = null; // <TokenLabelType()>"
TokenTypeDecl(t) ::= "var <t.name> = 0; // <TokenLabelType()> type"
TokenListDecl(t) ::= "this.<t.name> = []; // of <TokenLabelType()>s"
RuleContextDecl(r) ::= "this.<r.name> = null; // <r.ctxName>"
RuleContextListDecl(rdecl) ::= "this.<rdecl.name> = []; // of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)   ::= <<
<t.name> = function() {
  return this.getToken(<parser.name>.<t.name>, 0);
};
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<

```
<t.name> = function(i) {
 if(i===undefined) {
  i = null;
 }
  if(i===null) {
     return this.getTokens(<parser.name>.<t.name>);
  } else {
     return this.getToken(<parser.name>.<t.name>, i);
  }
};

>>

ContextRuleGetterDecl(r)       ::= <<
<r.name> = function() {
   return this.getTypedRuleContext(<r.ctxName>,0);
};
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
   return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
<r.name> = function(i) {
   if(i===undefined) {
      i = null;
   }
   if(i===null) {
      return this.getTypedRuleContexts(<r.ctxName>);
   } else {
      return this.getTypedRuleContext(<r.ctxName>,i);
   }
};
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
```

```
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)     ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = this._input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
function <struct.name>(parser, parent, invokingState<struct.ctorAttrs:{a | , <a.name>}>) {
 if(parent===undefined) {
    parent = null;
 }
 if(invokingState===undefined || invokingState===null) {
 invokingState = -1;
 }
 <if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.call(this, parent,
invokingState);
   this.parser = parser;
   this.ruleIndex = <parser.name>.RULE_<struct.derivedFromName>;
   <attrs:{a | <a>}; separator="\n">
   <struct.ctorAttrs:{a | this.<a.name> = <a.name> || null;}; separator="\n">
   return this;
}

<struct.name>.prototype =
Object.create(<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
<struct.name>.prototype.copyFrom = function(ctx) {
<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype.copyFrom.call(this,
ctx);
   <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
};
<endif>
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
function <struct.name>(parser, ctx) {
 <currentRule.name; format="cap">Context.call(this, parser);
   <attrs:{a | <a>;}; separator="\n">
   <currentRule.name; format="cap">Context.prototype.copyFrom.call(this, ctx);
   return this;
}
```

```
<struct.name>.prototype = Object.create(<currentRule.name; format="cap">Context.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<! Define fields of this parser to export this struct/context class !>
<parser.name>.<struct.name> = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">
<dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
<struct.name>.prototype.<if(method.isEnter)>enter<else>exit<endif>Rule = function(listener) {
  if(listener instanceof <parser.grammarName>Listener ) {
     listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
 }
};

>>

VisitorDispatchMethod(method) ::= <<
<struct.name>.prototype.accept = function(visitor) {
  if ( visitor instanceof <parser.grammarName>Visitor ) {
     return visitor.visit<struct.derivedFromName; format="cap">(this);
  } else {
     return visitor.visitChildren(this);
  }
};

>>

AttributeDecl(d) ::= "this.<d.name> = <if(d.initValue)><d.initValue><else>null<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "this.precpred(this._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()             ::= "this._ctx.stop = this._input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = new <ctxName>Context(this, _parentctx, _parentState);
<if(label)>localctx.<label> = _prevctx;<endif>
```

```
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>


recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = new <currentAltLabel; format="cap">Context(this, new <ruleName; format="cap">Context(this,
_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
localctx.<label>.push(_prevctx);
<else>
localctx.<label> = _prevctx;
<endif>
<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>


recRuleReplaceContext(ctxName) ::= <<
localctx = new <ctxName>Context(this, localctx);
this._ctx = localctx;
_prevctx = localctx;
>>


recRuleSetPrevCtx() ::= <<
if(this._parseListeners!==null) {
   this.triggerExitRuleEvent();
}
_prevctx = localctx;
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
var antlr4 = require('antlr4/index');

<namedActions.header>

<lexer>

>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });
```

```
function <lexer.name>(input) {
 <if(superClass)><superClass><else>antlr4.Lexer<endif>.call(this, input);
    this._interp = new antlr4.atn.LexerATNSimulator(this, atn, decisionsToDFA, new
antlr4.PredictionContextCache());
    return this;
}

<lexer.name>.prototype = Object.create(<if(superClass)><superClass><else>antlr4.Lexer<endif>.prototype);
<lexer.name>.prototype.constructor = <lexer.name>;

<lexer.name>.EOF = antlr4.Token.EOF;
<lexer.tokens:{k | <lexer.name>.<k> = <lexer.tokens.(k)>;}; separator="\n", wrap, anchor>

<rest(lexer.modes):{m| <lexer.name>.<m> = <i>;}; separator="\n">

<lexer.name>.prototype.modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.literalNames = [ <lexer.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

<lexer.name>.prototype.symbolicNames = [ <lexer.symbolicNames:{t | <t>}; null="null", separator=", ", wrap,
anchor> ];

<lexer.name>.prototype.ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.grammarFileName = "<lexer.grammarFileName>";

<namedActions.members>

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

exports.<lexer.name> = <lexer.name>;

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

var serializedATN = ["<model.serialized; wrap={",<\n>    "}>"].join("");

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>
```

codeFileExtension() ::= ".js"

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/JavaScript/JavaScript.stg
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 */

/** Find left-recursive rules */
tree grammar LeftRecursiveRuleWalker;

options {
 tokenVocab=ANTLRParser;
   ASTLabelType=GrammarAST;
}

@header {
package org.antlr.v4.parse;
```

```
import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
private String ruleName;
private int currentOuterAltNumber; // which outer alt of rule?
public int numAlts;  // how many alts for this rule total?

public void setAltAssoc(AltAST altTree, int alt) { }
public void binaryAlt(AltAST altTree, int alt) { }
public void prefixAlt(AltAST altTree, int alt) { }
public void suffixAlt(AltAST altTree, int alt) { }
public void otherAlt(AltAST altTree, int alt) { }
public void setReturnValues(GrammarAST t) { }
}

@rulecatch { }

// TODO: can get parser errors for not matching pattern; make them go away
public
rec_rule returns [boolean isLeftRec]
@init
{
 currentOuterAltNumber = 1;
}
 : ^( r=RULE id=RULE_REF {ruleName=$id.getText();}
   ruleModifier?
//   (ARG_ACTION)? shouldn't allow args, right?
   (^(RETURNS a=ARG_ACTION {setReturnValues($a);}))?
//     ( ^(THROWS .+) )? don't allow
     ( ^(LOCALS ARG_ACTION) )? // TODO: copy these to gen'd code
     ( ^(OPTIONS .*)
     | ^(AT ID ACTION) // TODO: copy
     )*
   ruleBlock {$isLeftRec = $ruleBlock.isLeftRec;}
   exceptionGroup
  )
 ;

exceptionGroup
  : exceptionHandler* finallyClause?
  ;

exceptionHandler
 : ^(CATCH ARG_ACTION ACTION)
 ;
```

```
finallyClause
 : ^(FINALLY ACTION)
 ;


ruleModifier
  : PUBLIC
  | PRIVATE
  | PROTECTED
  ;


ruleBlock returns [boolean isLeftRec]
@init{boolean lr=false; this.numAlts = $start.getChildCount();}
 : ^( BLOCK
  (
   o=outerAlternative
   {if ($o.isLeftRec) $isLeftRec = true;}
   {currentOuterAltNumber++;}
  )+
 )
 ;


/** An alt is either prefix, suffix, binary, or ternary operation or "other" */
outerAlternative returns [boolean isLeftRec]
  :  (binary)=>       binary
                   {binaryAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
  |  (prefix)=>       prefix
                   {prefixAlt((AltAST)$start, currentOuterAltNumber);}
  |  (suffix)=>       suffix
                   {suffixAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
  |  nonLeftRecur        {otherAlt((AltAST)$start,  currentOuterAltNumber);}
  ;


binary
 : ^( ALT elementOptions? recurse element* recurse epsilonElement* )
     {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;


prefix
 : ^( ALT elementOptions?
   element+
   recurse epsilonElement*
  )
     {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;


suffix
  :  ^( ALT elementOptions? recurse element+ )
```

```
          {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
  ;


nonLeftRecur
   :  ^(ALT elementOptions? element+)
   ;


recurse
 : ^(ASSIGN ID recurseNoLabel)
 | ^(PLUS_ASSIGN ID recurseNoLabel)
 | recurseNoLabel
 ;


recurseNoLabel : {((CommonTree)input.LT(1)).getText().equals(ruleName)}? RULE_REF;


token returns [GrammarAST t=null]
 : ^(ASSIGN ID s=token {$t = $s.t;})
 | ^(PLUS_ASSIGN ID s=token {$t = $s.t;})
 | b=STRING_LITERAL        {$t = $b;}
   | ^(b=STRING_LITERAL elementOptions)  {$t = $b;}
   | ^(c=TOKEN_REF elementOptions)   {$t = $c;}
 | c=TOKEN_REF           {$t = $c;}
 ;


elementOptions
   : ^(ELEMENT_OPTIONS elementOption*)
   ;


elementOption
   : ID
   |  ^(ASSIGN ID ID)
   |  ^(ASSIGN ID STRING_LITERAL)
   |  ^(ASSIGN ID ACTION)
   |  ^(ASSIGN ID INT)
   ;


element
 : atom
 | ^(NOT element)
 | ^(RANGE atom atom)
 | ^(ASSIGN ID element)
 | ^(PLUS_ASSIGN ID element)
   | ^(SET setElement+)
   |  RULE_REF
 | ebnf
 | epsilonElement
 ;
```

```
epsilonElement
 : ACTION
 | SEMPRED
 | EPSILON
 | ^(ACTION elementOptions)
 | ^(SEMPRED elementOptions)
 ;

setElement
 : ^(STRING_LITERAL elementOptions)
 | ^(TOKEN_REF elementOptions)
 | STRING_LITERAL
 | TOKEN_REF
 ;

ebnf:   block
  |  ^( OPTIONAL block )
  |  ^( CLOSURE block )
  |  ^( POSITIVE_CLOSURE block )
  ;

block
  : ^(BLOCK ACTION? alternative+)
  ;

alternative
 : ^(ALT elementOptions? element+)
  ;

atom
 : ^(RULE_REF ARG_ACTION? elementOptions?)
  | ^(STRING_LITERAL elementOptions)
 | STRING_LITERAL
  | ^(TOKEN_REF elementOptions)
 | TOKEN_REF
  | ^(WILDCARD elementOptions)
 | WILDCARD
 | ^(DOT ID element)
 ;
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/parse/LeftRecursiveRuleWalker.g
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```
/*
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```

```
atn(startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph ATN {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>


dfa(name, startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph <name>  {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>


decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states:{s | s<s>}; separator="; ">}
>>
```

edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,label,target,arrowhead,transitionIndex,loopback=false) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontname="Times-Italic",
label="ε"<if(loopback)>, style="dashed"<endif>];
>>

state(state, label, name, transitions) ::= <%
<name>[fontsize=11,
  label="
    <! rest(transition) tests for decision states: these nodes have a non-empty set of transitions after the first one. !>
    <if(rest(transitions))>
      {
      <! Label on the left side of the record node. !>
      <label>
      |
      <! Named ports in order on right side of record node, no display text. !>
      {<transitions:{t|\<p<i0>>}; separator="|">}}
    <else>
      <label>
    <endif>
    "
  <if(rest(transitions))>
    , shape=record, fixedsize=false
  <else>
    , shape=circle, fixedsize=true, width=.55
  <endif>
  , peripheries=1];
%>

stopstate(name,label,actionIndex,useBox) ::= <<
<name>[fontsize=11, label="<label><if(actionIndex)>,\naction:<actionIndex><endif>",
<if(useBox)>shape=polygon,sides=4,peripheries=2,fixedsize=false<else>shape=doublecircle, fixedsize=true,
width=.6<endif>];
>>

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/dot/graphs.stg

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 */

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.Text;
using System.Diagnostics;
using System.Collections.Generic;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using DFA = Antlr4.Runtime.Dfa.DFA;

<parser>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using IParseTreeListener = Antlr4.Runtime.Tree.IParseTreeListener;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
```

```
/// This interface defines a complete listener for a parse tree produced by
/// \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Listener : IParseTreeListener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>

using Antlr4.Runtime.Misc;
using IErrorNode = Antlr4.Runtime.Tree.IErrorNode;
using ITerminalNode = Antlr4.Runtime.Tree.ITerminalNode;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;
```

```
/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Listener"/>,
/// which can be extended to create a listener which only needs to handle a subset
/// of the available methods.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseListener : I<file.grammarName>Listener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}}; separator="\n">

 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void EnterEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void ExitEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitTerminal([NotNull] ITerminalNode node) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitErrorNode([NotNull] IErrorNode node) { }
}
<if(file.genPackage)>
```

```
} // namespace <file.genPackage>
<endif>
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete generic visitor for a parse tree produced
/// by \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Visitor\<Result> : IParseTreeVisitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
```

```
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;


/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Visitor{Result}"/>,
/// which can be extended to create a visitor which only needs to handle a subset
/// of the available methods.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseVisitor\<Result> : AbstractParseTreeVisitor\<Result>,
I<file.grammarName>Visitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>
/// The default implementation returns the result of calling \<see
cref="AbstractParseTreeVisitor{Result\}.VisitChildren(IRuleNode)"/>
/// on \<paramref name="context"/>.
/// \</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
public virtual Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { return VisitChildren(context); \}}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------
```

```
// Generated from <grammarFileName> by ANTLR <ANTLRVersion>

// Unreachable code detected
#pragma warning disable 0162
// The variable '...' is assigned but its value is never used
#pragma warning disable 0219
// Missing XML comment for publicly visible type or member '...'
#pragma warning disable 1591
// Ambiguous reference in cref attribute
#pragma warning disable 419

>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(parser.name)> : <superClass; null="Parser"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 <if(parser.tokens)>
 public const int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public const int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 public static readonly string[] ruleNames = {
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 public override string GrammarFileName { get { return "<parser.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }

 public override string SerializedAtn { get { return _serializedATN; } }

 static <csIdentifier.(parser.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }
```

```
 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>: return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
  }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
 }
 >>

vocabulary(literalNames, symbolicNames) ::= <<
private static readonly string[] _LiteralNames = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static readonly string[] _SymbolicNames = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static readonly IVocabulary DefaultVocabulary = new Vocabulary(_LiteralNames, _SymbolicNames);

[NotNull]
public override IVocabulary Vocabulary
{
 get
 {
  return DefaultVocabulary;
 }
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
public override void Action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex> : <f.name>_action(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, actionIndex); break;};
separator="\n">
 }
}
```

```
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex> : return <f.name>_sempred(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, predIndex);};
separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(parser) ::= <<
public <csIdentifier.(parser.name)>(ITokenStream input)
 : base(input)
{
 Interpreter = new ParserATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>: <actions.(index)> break;}; separator="\n">
 }
}
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private bool <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>: return <actions.(index)>;}; separator="\n">
 }
 return true;
}
>>
```

```
RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<if(ruleCtx)>
<ruleCtx>
<endif>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
 <endif>
 finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
 }
>>

LeftFactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
```

```
EnterLeftFactoredRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
<namedActions.init>
<locals; separator="\n">
try {
<if(currentRule.hasLookaheadBlock)>
int _alt;
<endif>
<code>
<postamble; separator="\n">
<namedActions.after>
}
catch (RecognitionException re) {
_localctx.exception = re;
ErrorHandler.ReportError(this, re);
ErrorHandler.Recover(this, re);
}
finally {
<finallyAction>
ExitRule();
}
return _localctx;
}
>>


// This behaves similar to RuleFunction (enterRule is called, and no adjustments
// are made to the parse tree), but since it's still a variant no context class
// needs to be generated.
LeftUnfactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
<currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
<namedActions.init>
<locals; separator="\n">
try {
<if(currentRule.hasLookaheadBlock)>
int _alt;
<endif>
<code>
<postamble; separator="\n">
<namedActions.after>
}
catch (RecognitionException re) {
_localctx.exception = re;
ErrorHandler.ReportError(this, re);
```

```
 ErrorHandler.Recover(this, re);
 }
 finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
 }
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 return <csIdentifier.(currentRule.name)>(0<currentRule.args:{a | , <csIdentifier.(a.name)>}>);
 }

private <currentRule.ctxType> <csIdentifier.(currentRule.name)>(int _p<args:{a | , <a>}>) {
 ParserRuleContext _parentctx = Context;
 int _parentState = State;
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, _parentState<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 EnterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
 finally {
 <finallyAction>
```

```
  UnrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
EnterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
```

```
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 State = <choice.stateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 <iteration>
} while ( <loopExpr> );
>>


// LL(*) stuff


AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i>:
 <alt>
 break;}; separator="\n">
}
>>
```

```
OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
_alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
}
>>


PlusBlock(choice, alts, error) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 State = <choice.loopBackStateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
} while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "Sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"
```

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>) && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(tokenType.(ttype), bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<tokenType.(ttype)>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <tokenType.(t)>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
State = <r.stateNumber>; <if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><csIdentifier.(r.name)>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>);
>>

MatchToken(m) ::= <<
State = <m.stateNumber>; <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>Match(<tokenType.(m.name)>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

```
CommonSetStuff(m, expr, capture, invert) ::= <<
State = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>TokenStream.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>ErrorHandler.RecoverInline(this);
}
else {
 ErrorHandler.ReportMatch(this);
  Consume();
}
>>


Wildcard(w) ::= <<
State = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>MatchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
State = <p.stateNumber>;
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "Skip();"
LexerMoreCommand()  ::= "More();"
LexerPopModeCommand() ::= "PopMode();"

LexerTypeCommand(arg, grammar)      ::= "_type = <tokenType.(arg)>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <channelName.(arg)>;"
LexerModeCommand(arg, grammar)      ::= "_mode = <modeName.(arg)>;"
LexerPushModeCommand(arg, grammar) ::= "PushMode(<modeName.(arg)>);"
```

```
ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
LocalRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
RetValueRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<csIdentifier.(a.name)>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<csIdentifier.(tokenType.(t.name))>"
LabelRef(t) ::= "<ctx(t)>.<csIdentifier.(t.name)>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(csIdentifier.(t.name))>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<csIdentifier.(s.name)> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={IToken}>"
InputSymbolType() ::= "<file.InputSymbolType; null={IToken}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Text:null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Type:0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Line:0)"
TokenPropertyRef_pos(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.CharPositionInLine:0)"
TokenPropertyRef_channel(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Channel:0)"
TokenPropertyRef_index(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.TokenIndex:0)"
TokenPropertyRef_int(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?int.Parse(<ctx(t)>.<tokenType.(t.label)>.Text):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?TokenStream.GetText(<ctx(r)>.<r.label>.Start,<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.Start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.Stop"
ThisRulePropertyRef_text(r)  ::= "TokenStream.GetText(_localctx.Start, TokenStream.LT(-1))"
ThisRulePropertyRef_ctx(r)   ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "this"

NonLocalAttrRef(s)   ::= <%((<s.ruleName;
format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)>%>
SetNonLocalAttr(s, rhsChunks)   ::=
 <%((<s.ruleName; format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)> =
<rhsChunks>;%>

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.Add(<labelref(a.label)>);"
```

TokenDecl(t) ::= "<TokenLabelType()> <csIdentifier.(tokenType.(t.name))>"
TokenTypeDecl(t) ::= "int <csIdentifier.(tokenType.(t.name))>;"
TokenListDecl(t) ::= "IList\<IToken> <csIdentifier.(tokenType.(t.name))> = new List\<IToken>()"
RuleContextDecl(r) ::= "<r.ctxName> <csIdentifier.(r.name)>"
RuleContextListDecl(rdecl) ::= "IList\<<rdecl.ctxName>> <csIdentifier.(rdecl.name)> = new
List\<<rdecl.ctxName>>()"

contextGetterCollection(elementType) ::= <%
<elementType>[]
%>

ContextTokenGetterDecl(t)   ::=
  "public ITerminalNode <csIdentifier.(tokenType.(t.name))>() { return
GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, 0); }"
ContextTokenListGetterDecl(t) ::= <<
public <contextGetterCollection("ITerminalNode")> <csIdentifier.(tokenType.(t.name))>() { return
GetTokens(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>); }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
public ITerminalNode <csIdentifier.(tokenType.(t.name))>(int i) {
 return GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>() {
 return GetRuleContext\<<r.ctxName>\>(0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public <contextGetterCollection({<r.ctxName>})> <csIdentifier.(r.name)>() {
 return GetRuleContexts\<<r.ctxName>\>();
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>(int i) {
 return GetRuleContext\<<r.ctxName>\>(i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenType.(tokenName)>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"

```
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "_<label>"


CaptureNextToken(d) ::= "<d.varName> = TokenStream.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = TokenStream.LA(1);"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
        superClass={ParserRuleContext}) ::= <<
public partial class <struct.name> :
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) : base(parent, invokingState) {
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>)
  : base(parent, invokingState)
 {
  <struct.ctorAttrs:{a | this.<csIdentifier.(a.name)> = <csIdentifier.(a.name)>;}; separator="\n">
 }
 public override int RuleIndex { get { return RULE_<struct.derivedFromName>; } }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public virtual void CopyFrom(<struct.name> context) {
  base.CopyFrom(context);
  <struct.attrs:{a | this.<csIdentifier.(a.name)> = context.<csIdentifier.(a.name)>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public partial class <struct.name> : <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context context) { CopyFrom(context); }
 <dispatchMethods; separator="\n">
}
>>


ListenerDispatchMethod(method) ::= <<
public override void <if(method.isEnter)>Enter<else>Exit<endif>Rule(IParseTreeListener listener) {
 I<parser.grammarName>Listener typedListener = listener as I<parser.grammarName>Listener;
 if (typedListener != null) typedListener.<if(method.isEnter)>Enter<else>Exit<endif><struct.derivedFromName;
format="cap">(this);
}
```

```
>>

VisitorDispatchMethod(method) ::= <<
public override TResult Accept\<TResult>(IParseTreeVisitor\<TResult> visitor) {
 I<parser.grammarName>Visitor\<TResult> typedVisitor = visitor as I<parser.grammarName>Visitor\<TResult>;
 if (typedVisitor != null) return typedVisitor.Visit<struct.derivedFromName; format="cap">(this);
 else return visitor.VisitChildren(this);
}
>>

AttributeDecl(d) ::= "<d.type> <csIdentifier.(d.name)><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)><typedContext(x.ctx)>.<endif><csIdentifier.(x.name)>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "<typedContext(actionChunk.ctx)>"

// only casts _localctx to the type when the cast isn't redundant (i.e. to a sub-context for a labeled alt)
typedContext(ctx) ::= "<if(ctx.provideCopyFrom)>((<ctx.name>)_localctx)<else>_localctx<endif>"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "Precpred(Context, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()            ::= "Context.Stop = TokenStream.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.Add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.Add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
```

```
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
Context = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( ParseListeners!=null )
 TriggerExitRuleEvent();
_prevctx = _localctx;
>>


LexerFile(file, lexer, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.Text;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using DFA = Antlr4.Runtime.Dfa.DFA;

<lexer>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(lexer.name)> : <superClass; null="Lexer"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 public const int
  <lexer.tokens:{k | <tokenType.(k)>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
 <if(lexer.channels)>
 public const int
  <lexer.channels:{k | <csIdentifier.(k)>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 <rest(lexer.modes):{m| public const int <modeName.(m)> = <i>;}; separator="\n">
```

```
public static string[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

public static readonly string[] ruleNames = {
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<namedActions.members>

public <csIdentifier.(lexer.name)>(ICharStream input)
 : base(input)
{
 Interpreter = new LexerATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

public override string GrammarFileName { get { return "<lexer.grammarFileName>"; } }

public override string[] RuleNames { get { return ruleNames; } }

public override string[] ModeNames { get { return modeNames; } }

public override string SerializedAtn { get { return _serializedATN; } }

static <csIdentifier.(lexer.name)>() {
 decisionToDFA = new DFA[_ATN.NumberOfDecisions];
 for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
  decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
 }
}
<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
}
>>


SerializedATN(model) ::= <<
private static string _serializedATN = _serializeATN();
private static string _serializeATN()
{
  StringBuilder sb = new StringBuilder();
  sb.Append("<model.serialized; wrap={");<\n><\t>sb.Append("}>");
  return sb.ToString();
}

public static readonly ATN _ATN =
```

```
new ATNDeserializer().Deserialize(_serializedATN.ToCharArray());
```

>>

initValue(typeName) ::= <<
default(<typeName>)
>>

codeFileExtension() ::= ".cs"

modeName ::= [
 "DEFAULT_MODE" : "DefaultMode",
 default : key
]

channelName ::= [
 "HIDDEN" : "Hidden",
 "DEFAULT_TOKEN_CHANNEL" : "DefaultTokenChannel",
 default : key
]

tokenType ::= [
 "EOF" : "Eof",
 default : key
]

csIdentifier ::= [
 "abstract" : "@abstract",
 "as" : "@as",
 "base" : "@base",
 "bool" : "@bool",
 "break" : "@break",
 "byte" : "@byte",
 "case" : "@case",
 "catch" : "@catch",
 "char" : "@char",
 "checked" : "@checked",
 "class" : "@class",
 "const" : "@const",
 "continue" : "@continue",
 "decimal" : "@decimal",
 "default" : "@default",
 "delegate" : "@delegate",
 "do" : "@do",
 "double" : "@double",
 "else" : "@else",
 "enum" : "@enum",

```
"event" : "@event",
"explicit" : "@explicit",
"extern" : "@extern",
"false" : "@false",
"finally" : "@finally",
"fixed" : "@fixed",
"float" : "@float",
"for" : "@for",
"foreach" : "@foreach",
"goto" : "@goto",
"if" : "@if",
"implicit" : "@implicit",
"in" : "@in",
"int" : "@int",
"interface" : "@interface",
"internal" : "@internal",
"is" : "@is",
"lock" : "@lock",
"long" : "@long",
"namespace" : "@namespace",
"new" : "@new",
"null" : "@null",
"object" : "@object",
"operator" : "@operator",
"out" : "@out",
"override" : "@override",
"params" : "@params",
"private" : "@private",
"protected" : "@protected",
"public" : "@public",
"readonly" : "@readonly",
"ref" : "@ref",
"return" : "@return",
"sbyte" : "@sbyte",
"sealed" : "@sealed",
"short" : "@short",
"sizeof" : "@sizeof",
"stackalloc" : "@stackalloc",
"static" : "@static",
"string" : "@string",
"struct" : "@struct",
"switch" : "@switch",
"this" : "@this",
"throw" : "@throw",
"true" : "@true",
"try" : "@try",
"typeof" : "@typeof",
"uint" : "@uint",
```

```
"ulong" : "@ulong",
"unchecked" : "@unchecked",
"unsafe" : "@unsafe",
"ushort" : "@ushort",
"using" : "@using",
"virtual" : "@virtual",
"void" : "@void",
"volatile" : "@volatile",
"while" : "@while",
default : key
]
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/CSharp/CSharp.stg
No license file was found, but licenses were detected in source scan.

```
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 */

lexer grammar ActionSplitter;
```

```
options { filter=true; }

@header {
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
ActionSplitterListener delegate;

public ActionSplitter(CharStream input, ActionSplitterListener delegate) {
  this(input, new RecognizerSharedState());
  this.delegate = delegate;
}

/** force filtering (and return tokens). triggers all above actions. */
public List<Token> getActionTokens() {
  List<Token> chunks = new ArrayList<Token>();
  Token t = nextToken();
  while ( t.getType()!=Token.EOF ) {
    chunks.add(t);
    t = nextToken();
  }
  return chunks;
}

private boolean isIDStartChar(int c) {
 return c == '_' || Character.isLetter(c);
}
}

// ignore comments right away

COMMENT
  : '/*' ( options {greedy=false;} : . )* '*/' {delegate.text($text);}
  ;

LINE_COMMENT
  : '//' ~('\n'|'\r')* '\r'? '\n' {delegate.text($text);}
  ;

SET_NONLOCAL_ATTR
 : '$' x=ID '::' y=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
  {
  delegate.setNonLocalAttr($text, $x, $y, $expr);
  }
```

;

NONLOCAL_ATTR
 : '$' x=ID '::' y=ID {delegate.nonLocalAttr($text, $x, $y);}
 ;

QUALIFIED_ATTR
 : '$' x=ID '.' y=ID {input.LA(1)!='('}? {delegate.qualifiedAttr($text, $x, $y);}
 ;

SET_ATTR
 : '$' x=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
 {
 delegate.setAttr($text, $x, $expr);
 }
 ;

ATTR
 : '$' x=ID {delegate.attr($text, $x);}
 ;

// Anything else is just random text
TEXT
@init {StringBuilder buf = new StringBuilder();}
@after {delegate.text(buf.toString());}
 : (c=~('\\'| '$') {buf.append((char)$c);}
 | '\\$' {buf.append('$');}
 | '\\' c=~('$') {buf.append('\\').append((char)$c);}
 | {!isIDStartChar(input.LA(2))}? => '$' {buf.append('$');}
)+
 ;

fragment
ID : ('a'..'z'|'A'..'Z'|'_') ('a'..'z'|'A'..'Z'|'0'..'9'|'_')*
  ;

/** Don't allow an = as first char to prevent $x == 3; kind of stuff. */
fragment
ATTR_VALUE_EXPR
 : ~'=' (~';')*
 ;

fragment
WS : (' '|'\t'|'\n'|'\r')+
 ;

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ActionSplitter.g

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```
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 * THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
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 * THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** ANTLR tool checks output templates are compatible with tool code generation.
 * For now, a simple string match used on x.y of x.y.z scheme.
 * Must match Tool.VERSION during load to templates.
 *
 * REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
 ]
```

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO

<namedActions.header>
<parser>

>>


ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

    <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx):
  pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx):
  pass

}; separator="\n">

>>



VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx):
```

```
    return self.visitChildren(ctx)


}; separator="\n">


>>



fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>


<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

  grammarFileName = "<parser.grammarFileName>"

  atn = ATNDeserializer().deserialize(serializedATN())

  decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

  sharedContextCache = PredictionContextCache()

  literalNames = [ <parser.literalNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  symbolicNames = [ <parser.symbolicNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

  ruleNames =  [ <parser.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

  EOF = <TokenLabelType()>.EOF
  <if(parser.tokens)>
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
  <endif>

  <parser:(ctor)()>

  <namedActions.members>
```

```
      <funcs; separator="\n">


<if(sempredFuncs)>
   def sempred(self, localctx, ruleIndex, predIndex):
      if self._predicates == None:
         self._predicates = dict()
<parser.sempredFuncs.values:{f |
      self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n          ">
      pred = self._predicates.get(ruleIndex, None)
      if pred is None:
         raise Exception("No predicate with index:" + str(ruleIndex))
      else:
         return pred(localctx, predIndex)

   <sempredFuncs.values; separator="\n">
<endif>



>>

   dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx, ruleIndex, actionIndex):
 if self._actions is None:
  actions = dict()
<recog.actionFuncs.values:{f|
  actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
  self._actions = actions
 action = self._actions.get(ruleIndex, None)
 if action is not None:
  action(localctx, actionIndex)
 else:
  raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx, ruleIndex, predIndex):
   if self._predicates is None:
      preds = dict()
<recog.sempredFuncs.values:{f|
      preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
      self._predicates = preds
   pred = self._predicates.get(ruleIndex, None)
```

```
    if pred is not None:
        return pred(localctx, predIndex)
    else:
        raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
def __init__(self, input):
    super(<parser.name>, self).__init__(input)
    self.checkVersion("<file.ANTLRVersion>")
    self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
    self._predicates = None


>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx , actionIndex):
<actions:{index|
<if(first(actions))>
    if actionIndex == <index>:
        <actions.(index)>
<elseif(rest(actions))>
    elif actionIndex == <index>:
        <actions.(index)>
<endif> }; separator="\n">
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx, predIndex):
    <actions:{index|
<if(first(actions))>
    if predIndex == <index>:
        return <actions.(index)>
<elseif(rest(actions))>
    elif predIndex == <index>:
        return <actions.(index)>
<endif> }; separator="\n">
```

```
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name>}>):

    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
    self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    <endif>
    finally:
        <finallyAction>
        self.exitRule()
    return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
```

```
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    finally:
        <finallyAction>
        self.unrollRecursionContexts(_parentctx)
    return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
```

```
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
  <alts; separator="\n">
  self.state = <choice.stateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  <iteration>
  if not (<loopExpr>):
    break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
```

```
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
  <alt>
  pass
}; separator="\nel">

>>


OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">

>>


StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  if _alt==1<if(!choice.ast.greedy)>+1<endif>:
      <iteration>
      <alts> <! should only be one !>
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>


PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">
  else:
      <error>
```

```
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)


>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" or ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})>) and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>


cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>
```

```
InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>


MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |    <labelref(l)> = }><else>   <endif>self._errHandler.recoverInline(self)
else:
  self._errHandler.reportMatch(self)
  self.consume()
>>


Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
  from antlr4.error.Errors import FailedPredicateException
  raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
```

```
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type())"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
```

ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s) ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)   ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<
def <t.name>(self, i=None):
  if i is None:
     return self.getTokens(<parser.name>.<t.name>)
  else:
     return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)   ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r) ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r) ::= <<
def <r.name>(self, i=None):

```
      if i is None:
        return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
      else:
        return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)


>>


LexerRuleContext() ::= "RuleContext"


/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"


ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"


CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent=None, invokingState=-1<struct.ctorAttrs:{a | , <a.name>=None}>):
    super(<parser.name>.<struct.name>, self).__init__(parent, invokingState)
    self.parser = parser
    <attrs:{a | <a>}; separator="\n">
    <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

  <getters:{g | <g>}; separator="\n\n">

  def getRuleIndex(self):
    return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx):
    super(<parser.name>.<struct.name>, self).copyFrom(ctx)
    <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
  <extensionMembers; separator="\n">


>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
```

```
class <struct.name>(<currentRule.name; format="cap">Context):

  def __init__(self, parser, ctx): # actually a <parser.name>.<currentRule.name; format="cap">Context)
    super(<parser.name>.<struct.name>, self).__init__(parser)
    <attrs:{a | <a>}; separator="\n">
    self.copyFrom(ctx)

  <getters:{g | <g>}; separator="\n">

  <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener):
  if hasattr(listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">"):
    listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor):
  if hasattr(visitor, "visit<struct.derivedFromName; format="cap">"):
    return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
    return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()            ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>
```

```
recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>


recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
    self.triggerExitRuleEvent()
_prevctx = localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]
```

```
<rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

modeNames = [ <lexer.modes:{m| u"<m>"}; separator=", ", wrap, anchor> ]

literalNames = [ u"\<INVALID>",
        <lexer.literalNames:{t | u<t>}; separator=", ", wrap, anchor> ]

symbolicNames = [ u"\<INVALID>",
        <lexer.symbolicNames:{t | u<t>}; separator=", ", wrap, anchor> ]

ruleNames = [ <lexer.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

grammarFileName = u"<lexer.grammarFileName>"

def __init__(self, input=None):
    super(<lexer.name>, self).__init__(input)
    self.checkVersion("<lexerFile.ANTLRVersion>")
    self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
    self._actions = None
    self._predicates = None

<namedActions.members>

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write(u"<model.serialized; wrap={")<\n>        buf.write(u"}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/codegen/Python2/Python2.stg
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 *  Copyright (c) 2012-2016 Terence Parr
 *  Copyright (c) 2012-2016 Sam Harwell
 *  All rights reserved.
 *
 *  Redistribution and use in source and binary forms, with or without
 *  modification, are permitted provided that the following conditions
 *  are met:
 *
 *  1. Redistributions of source code must retain the above copyright
 *     notice, this list of conditions and the following disclaimer.
 *  2. Redistributions in binary form must reproduce the above copyright
 *     notice, this list of conditions and the following disclaimer in the
 *     documentation and/or other materials provided with the distribution.
 *  3. The name of the author may not be used to endorse or promote products
 *     derived from this software without specific prior written permission.
 *
 *  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
 *  IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
 *  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
 *  IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
 *  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
 *  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
 *  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
 *  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

javaTypeInitMap ::= [
	"int":"0",
	"long":"0",
	"float":"0.0f",
	"double":"0.0",
	"boolean":"false",
	"byte":"0",
	"short":"0",
	"char":"0",
	default:"null" // anything other than a primitive type is an object
]
```

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.misc.*;
import org.antlr.v4.runtime.tree.*;
import java.util.List;
import java.util.Iterator;
import java.util.ArrayList;

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeListener;

/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
public interface <file.grammarName>Listener extends ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 * @param ctx the parse tree
 */
void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
```

```
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>

import org.antlr.v4.runtime.ParserRuleContext;
import org.antlr.v4.runtime.tree.ErrorNode;
import org.antlr.v4.runtime.tree.TerminalNode;

/**
 * This class provides an empty implementation of {@link <file.grammarName>Listener},
 * which can be extended to create a listener which only needs to handle a subset
 * of the available methods.
 */
public class <file.grammarName>BaseListener implements <file.grammarName>Listener {
 <file.listenerNames:{lname |
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
@Override public void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
@Override public void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}};
separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void enterEveryRule(ParserRuleContext ctx) { }
 /**
```

```
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
@Override public void exitEveryRule(ParserRuleContext ctx) { }
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
@Override public void visitTerminal(TerminalNode node) { }
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
@Override public void visitErrorNode(ErrorNode node) { }
}
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeVisitor;

/**
 * This interface defines a complete generic visitor for a parse tree produced
 * by {@link <file.parserName>}.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
public interface <file.grammarName>Visitor\<T> extends ParseTreeVisitor\<T> {
  <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
 * Visit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
 * Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 * @param ctx the parse tree
 * @return the visitor result
 */
T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
```

```
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.AbstractParseTreeVisitor;

/**
 * This class provides an empty implementation of {@link <file.grammarName>Visitor},
 * which can be extended to create a visitor which only needs to handle a subset
 * of the available methods.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
public class <file.grammarName>BaseVisitor\<T> extends AbstractParseTreeVisitor\<T> implements
<file.grammarName>Visitor\<T> {
 <file.visitorNames:{lname |
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation returns the result of calling
 * {@link #visitChildren\} on {@code ctx\}.\</p>
 */
@Override public T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { return
visitChildren(ctx); \}}; separator="\n">
}
>>

fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <parser.name> extends <superClass; null="Parser"> {
 static { RuntimeMetaData.checkVersion("<file.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
```

```
 new PredictionContextCache();
<if(parser.tokens)>
public static final int
 <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
<endif>
public static final int
 <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
public static final String[] ruleNames = {
 <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<vocabulary(parser.literalNames, parser.symbolicNames)>

@Override
public String getGrammarFileName() { return "<parser.grammarFileName; format="java-escape">"; }

@Override
public String[] getRuleNames() { return ruleNames; }

@Override
public String getSerializedATN() { return _serializedATN; }

@Override
public ATN getATN() { return _ATN; }

<namedActions.members>
<parser:(ctor)()>
<funcs; separator="\n">

<if(sempredFuncs)>
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <parser.sempredFuncs.values:{f|
case <f.ruleIndex>:
return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
 }
<sempredFuncs.values; separator="\n">
<endif>

<atn>
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static final String[] _LITERAL_NAMES = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
```

```
};
private static final String[] _SYMBOLIC_NAMES = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static final Vocabulary VOCABULARY = new VocabularyImpl(_LITERAL_NAMES,
_SYMBOLIC_NAMES);

/**
* @deprecated Use {@link #VOCABULARY} instead.
*/
@Deprecated
public static final String[] tokenNames;
static {
 tokenNames = new String[_SYMBOLIC_NAMES.length];
 for (int i = 0; i \< tokenNames.length; i++) {
  tokenNames[i] = VOCABULARY.getLiteralName(i);
  if (tokenNames[i] == null) {
   tokenNames[i] = VOCABULARY.getSymbolicName(i);
  }

  if (tokenNames[i] == null) {
   tokenNames[i] = "\<INVALID>";
  }
 }
}

@Override
@Deprecated
public String[] getTokenNames() {
 return tokenNames;
}

@Override

public Vocabulary getVocabulary() {
 return VOCABULARY;
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
@Override
public void action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((<f.ctxType>)_localctx, actionIndex);
 break;}; separator="\n">
```

```
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
@Override
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
public <p.name>(TokenStream input) {
 super(input);
 _interp = new ParserATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 }
}
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private boolean <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>:
 return <actions.(index)>;}; separator="\n">
```

```
}
return true;
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=",">) throws RecognitionException {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>);
 enterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 <if(exceptions)>
<exceptions; separator="\n">
 <else>
 catch (RecognitionException re) {
 _localctx.exception = re;
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
 }
 <endif>
 finally {
 <finallyAction>
 exitRule();
 }
 return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
```

```
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=", ">) throws RecognitionException {
 return <currentRule.name>(0<currentRule.args:{a | , <a.name>}>);
}

private <currentRule.ctxType> <currentRule.name>(int _p<args:{a | , <a>}>) throws RecognitionException {
 ParserRuleContext _parentctx = _ctx;
 int _parentState = getState();
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
 _localctx.exception = re;
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
 }
 finally {
 <finallyAction>
 unrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
```

```
<preamble; separator="\n">
<ops; separator="\n">
}
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
 }
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
 }
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>);
```

```
_errHandler.sync(this);
<iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
<preamble; separator="\n">
do {
<alts; separator="\n">
setState(<choice.stateNumber>); <! loopback/exit decision !>
_errHandler.sync(this);
<iteration>
} while ( <loopExpr> );
>>


// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i>:
<alt>
break;}; separator="\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
<alt>
break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
_alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER ) {
```

```
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
 }
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
 } while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>
```

```
isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>

MatchToken(m) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>match(<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }>_input.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = (Token)}><endif>_errHandler.recoverInline(this);
}
else {
 if ( _input.LA(1)==Token.EOF ) matchedEOF = true;
 _errHandler.reportMatch(this);
 consume();
}
>>
```

```
Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>


// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>);
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>


// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip();"
LexerMoreCommand()  ::= "more();"
LexerPopModeCommand() ::= "popMode();"


LexerTypeCommand(arg, grammar)     ::= "_type = <arg>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>;"
LexerModeCommand(arg, grammar)     ::= "_mode = <arg>;"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>);"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>;"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
```

InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getText():null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getType():0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getLine():0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getCharPositionInLine():0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getChannel():0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getTokenIndex():0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label>!=null?Integer.valueOf(<ctx(t)>.<t.label>.getText()):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.start):null)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_text(r) ::=
"(<ctx(r)>.<r.label>!=null?_input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r) ::= "_localctx.stop"
ThisRulePropertyRef_text(r) ::= "_input.getText(_localctx.start, _input.LT(-1))"
ThisRulePropertyRef_ctx(r)   ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)   ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <t.name>"
TokenTypeDecl(t) ::= "int <t.name>;"
TokenListDecl(t) ::= "List\<Token> <t.name> = new ArrayList\<Token>()"
RuleContextDecl(r) ::= "<r.ctxName> <r.name>"
RuleContextListDecl(rdecl) ::= "List\<<rdecl.ctxName>> <rdecl.name> = new ArrayList\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)   ::=
  "public TerminalNode <t.name>() { return getToken(<parser.name>.<t.name>, 0); }"
ContextTokenListGetterDecl(t) ::=
  "public List\<TerminalNode> <t.name>() { return getTokens(<parser.name>.<t.name>); }"
ContextTokenListIndexedGetterDecl(t) ::= <<
public TerminalNode <t.name>(int i) {
 return getToken(<parser.name>.<t.name>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>() {
 return getRuleContext(<r.ctxName>.class,0);
}

```
>>
ContextRuleListGetterDecl(r)   ::= <<
public List\<<r.ctxName>\> <r.name>() {
 return getRuleContexts(<r.ctxName>.class);
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>(int i) {
 return getRuleContext(<r.ctxName>.class,i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = _input.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = _input.LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers)
 ::= <<
public static class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) { super(parent, invokingState);
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>) {
  super(parent, invokingState);
  <struct.ctorAttrs:{a | this.<a.name> = <a.name>;}; separator="\n">
 }
 @Override public int getRuleIndex() { return RULE_<struct.derivedFromName>; }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public void copyFrom(<struct.name> ctx) {
  super.copyFrom(ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
```

```
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">
}
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public static class <struct.name> extends <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
  public <struct.name>(<currentRule.name; format="cap">Context ctx) { copyFrom(ctx); }
 <dispatchMethods; separator="\n">
}
>>


ListenerDispatchMethod(method) ::= <<
@Override
public void <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener listener) {
 if ( listener instanceof <parser.grammarName>Listener )
((<parser.grammarName>Listener)listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(this);
}
>>


VisitorDispatchMethod(method) ::= <<
@Override
public \<T> T accept(ParseTreeVisitor\<? extends T> visitor) {
 if ( visitor instanceof <parser.grammarName>Visitor ) return ((<parser.grammarName>Visitor\<? extends
T>)visitor).visit<struct.derivedFromName; format="cap">(this);
 else return visitor.visitChildren(this);
}
>>


AttributeDecl(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>((<x.ctx.name>)_localctx).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "((<actionChunk.ctx.name>)_localctx)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()              ::= "_ctx.stop = _input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentstate);
<if(label)>
```

```
<if(isListLabel)>
_localctx.<label>.add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
_ctx = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( _parseListeners!=null ) triggerExitRuleEvent();
_prevctx = _localctx;
>>

LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
package <lexerFile.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.Lexer;
import org.antlr.v4.runtime.CharStream;
import org.antlr.v4.runtime.Token;
import org.antlr.v4.runtime.TokenStream;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
```

```
import org.antlr.v4.runtime.misc.*;

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <lexer.name> extends <superClass; null="Lexer"> {
  static { RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION); }

  protected static final DFA[] _decisionToDFA;
  protected static final PredictionContextCache _sharedContextCache =
    new PredictionContextCache();
  public static final int
    <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
<if(lexer.channels)>
  public static final int
    <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
<endif>
  <rest(lexer.modes):{m| public static final int <m> = <i>;}; separator="\n">
  public static String[] modeNames = {
    <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
  };

  public static final String[] ruleNames = {
    <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
  };

  <vocabulary(lexer.literalNames, lexer.symbolicNames)>

  <namedActions.members>

  public <lexer.name>(CharStream input) {
    super(input);
    _interp = new LexerATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
  }

  @Override
  public String getGrammarFileName() { return "<lexer.grammarFileName>"; }

  @Override
  public String[] getRuleNames() { return ruleNames; }

  @Override
  public String getSerializedATN() { return _serializedATN; }

  @Override
  public String[] getModeNames() { return modeNames; }
```

```
@Override
public ATN getATN() { return _ATN; }

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
}
>>


SerializedATN(model) ::= <<
<if(rest(model.segments))>
<! requires segmented representation !>
private static final int _serializedATNSegments = <length(model.segments)>;
<model.segments:{segment|private static final String _serializedATNSegment<i0> =
"<segment; wrap={"+<\n><\t>"}>";}; separator="\n">
public static final String _serializedATN = Utils.join(
new String[] {
<model.segments:{segment | _serializedATNSegment<i0>}; separator=",\n">
},
""
);
<else>
<! only one segment, can be inlined !>
public static final String _serializedATN =
"<model.serialized; wrap={"+<\n><\t>"}>";
<endif>
public static final ATN _ATN =
new ATNDeserializer().deserialize(_serializedATN.toCharArray());
static {
_decisionToDFA = new DFA[_ATN.getNumberOfDecisions()];
for (int i = 0; i \< _ATN.getNumberOfDecisions(); i++) {
_decisionToDFA[i] = new DFA(_ATN.getDecisionState(i), i);
}
<! org.antlr.v4.tool.DOTGenerator dot = new org.antlr.v4.tool.DOTGenerator(null);!>
<! System.out.println(dot.getDOT(_ATN.decisionToState.get(0), ruleNames, false));!>
<! System.out.println(dot.getDOT(_ATN.ruleToStartState[2], ruleNames, false));!>
}
>>


/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>


codeFileExtension() ::= ".java"
```

Found in path(s):

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/codegen/Java/Java.stg

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*/

Found in path(s):

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ANTLRParser.java

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*/


// File     : A3Lexer.g
// Author   : Jim Idle (jimi@temporal-wave.com)
// Copyright : Free BSD - See @header clause below
// Version   : First implemented as part of ANTLR 3.2 this is the self
//            hosting ANTLR 3 Lexer.
//
// Description
// -----------
// This is the definitive lexer grammar for parsing ANTLR V3.x.x grammars. All other
// gramnmars are derived from this grammar via source code control integration (perforce)
// or by the gdiff tool.
//
// This grammar and its associated grmmmars A3Parser.g and A3Walker.g exhibit the following
// traits, which are recommended for all production quality grammars:
//
// 1) They are separate grammars, not composite grammars;
// 2) They implement all supporting methods in a superclass (at least this is recommended
//    for language targets that support inheritence;
// 3) All errors are pushed as far down the parsing chain as possible, which means
//    that the lexer tries to defer error reporting to the parser, and the parser
//    tries to defer error reporting to a semantic phase consisting of a single
//    walk of the AST. The reason for this is that the error messages produced
//    from later phases of the parse will generally have better context and so
//    be more useful to the end user. Consider the message: "Syntax error at 'options'"
//    vs: "You cannot specify two options{} sections in a single grammar file".
// 4) The lexer is 'programmed' to catch common mistakes such as unterminated literals
//    and report them specifically and not just issue confusing lexer mismatch errors.
//
```

```
/** Read in an ANTLR grammar and build an AST.  Try not to do
 *  any actions, just build the tree.
 *
 *  The phases are:
 *
 *  A3Lexer.g (this file)
 *          A3Parser.g
 *          A3Verify.g (derived from A3Walker.g)
 *  assign.types.g
 *  define.g
 *  buildnfa.g
 *  antlr.print.g (optional)
 *  codegen.g
 *
 *  Terence Parr
 *  University of San Francisco
 *  2005
 *  Jim Idle (this v3 grammar)
 *  Temporal Wave LLC
 *  2009
 */
lexer grammar ANTLRLexer;


// ============================================================================
// Note that while this grammar does not care about order of constructs
// that don't really matter, such as options before @header etc, it must first
// be parsed by the original v2 parser, before it replaces it. That parser does
// care about order of structures. Hence we are constrained by the v2 parser
// for at least the first bootstrap release that causes this parser to replace
// the v2 version.
// ============================================================================


// -------
// Options
//
// V3 option directives to tell the tool what we are asking of it for this
// grammar.
//
options {

 // Target language is Java, which is the default but being specific
 // here as this grammar is also meant as a good example grammar for
 // for users.
 //
 language     = Java;

 // The super class that this lexer should expect to inherit from, and
 // which contains any and all support routines for the lexer. This is
```

```
// commented out in this baseline (definitive or normative grammar)
// - see the ANTLR tool implementation for hints on how to use the super
//   class
//
//superclass    = AbstractA3Lexer;
}


tokens { SEMPRED; TOKEN_REF; RULE_REF; LEXER_CHAR_SET; ARG_ACTION; }


// Include the copyright in this source and also the generated source
//
@lexer::header {
/*
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*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
}


@members {
public static final int COMMENTS_CHANNEL = 2;

  public CommonTokenStream tokens; // track stream we push to; need for context info
```

```
    public boolean isLexerRule = false;

    public void grammarError(ErrorType etype, org.antlr.runtime.Token token, Object... args) { }

    /** scan backwards from current point in this.tokens list
     *  looking for the start of the rule or subrule.
     *  Return token or null if for some reason we can't find the start.
     */
    public Token getRuleOrSubruleStartToken() {
       if ( tokens==null ) return null;
      int i = tokens.index();
         int n = tokens.size();
         if ( i>=n ) i = n-1; // seems index == n as we lex
      while ( i>=0 && i<n) {
       int ttype = tokens.get(i).getType();
       if ( ttype == LPAREN || ttype == TOKEN_REF || ttype == RULE_REF ) {
        return tokens.get(i);
       }
       i--;
       }
      return null;
       }
    }


    // --------
    // Comments
    //
    // ANTLR comments can be multi or single line and we don't care
    // which particularly. However we also accept Javadoc style comments
    // of the form: /** ... */ and we do take care to distinguish those
    // from ordinary multi-line comments
    // Note how we guide the lexical PATH because we want to issue a decriptive
    // error message in case of a standalone '/' character, which makes no
    // sense in ANTLR source code. We alo trap unterminated multi-line comments
    //
    fragment DOC_COMMENT : ;
    COMMENT
    @init {

     // Record the start line and offsets as if we need to report an
     // unterminated comment, then we want to show the start of the comment
     // we think is broken, not the end, where people will have to try and work
     // it out themselves.
     //
     int startLine = $line;
     int offset   = getCharPositionInLine();
    }
      : // Eat the first character only, then see if we have a comment
```

```
// or something silly.
//
'/'  // Comment introducer

(
    // Single line comment, possibly with embedded src/line directives
    // in a similar style to the C pre-processor, allowing generated
    // code to refer the programmer back to the original source code
    // in case of error.
    //
    '/'
     (
        (' $ANTLR')=> ' $ANTLR' SRC
      | ~(NLCHARS)*
     )

  | // Multi-line comment, which may be a documentation comment
    // if it starts /** (note that we protect against accidentaly
    // recognizing a comment /**/ as a documentation comment
    //
    '*' (
        { input.LA(2) != '/'}?=> '*' { $type = DOC_COMMENT; }
      | { true }?=> // Required to cover all alts with predicates
      )

        // Should we support embedded multiline comments here?
        //
        (
            // Pick out end of multiline comment and exit the loop
            // if we find it.
            //
            {   !(input.LA(1) == '*' && input.LA(2) == '/') }?

             // Anything else other than the non-greedy match of
             // the comment close sequence
             //
             .
        )*
        (
            // Look for the comment terminator, but if it is accidentally
            // unterminated, then we will hit EOF, which will trigger the
            // epsilon alt and hence we can issue an error message relative
            // to the start of the unterminated multi-line comment
            //
            '*/'

          | // Unterminated comment!
            //
```

```
                  {
                    // ErrorManager.msg(Msg.UNTERMINATED_DOC_COMMENT, startLine, offset, $pos, startLine,
offset, $pos, (Object)null);
                  }
              )

       | // There was nothing that made sense following the opening '/' and so
         // we issue an error regarding the malformed comment
         //
         {
           // TODO: Insert error message relative to comment start
           //
         }
     )
     {
       // We do not wish to pass the comments in to the parser. If you are
       // writing a formatter then you will want to preserve the comments off
       // channel, but could just skip and save token space if not.
       //
       $channel=COMMENTS_CHANNEL;
     }
   ;


ARG_OR_CHARSET
options {k=1;}
   : {isLexerRule}?=> LEXER_CHAR_SET {$type=LEXER_CHAR_SET;}
   | {!isLexerRule}?=> ARG_ACTION
     {
     $type=ARG_ACTION;
     // Set the token text to our gathered string minus outer [ ]
     String t = $text;
     t = t.substring(1,t.length()-1);
     setText(t);
     }
   ;


fragment
LEXER_CHAR_SET
 : '['
  ( '\\' ~('\r'|'\n')
 | ~('\r'|'\n'|'\\'|']')
 )*
 ']'
 ;


// --------------
// Argument specs
//
```

```
// Certain argument lists, such as those specifying call parameters
// to a rule invocation, or input parameters to a rule specification
// are contained within square brackets. In the lexer we consume them
// all at once and sort them out later in the grammar analysis.
//
fragment
ARG_ACTION
 : '['
     (
         ARG_ACTION

       | ('"')=>ACTION_STRING_LITERAL

       | ('\'')=>ACTION_CHAR_LITERAL

       | ~('['|']')
     )*

     ']'
 ;


// -------
// Actions
//
// Other than making sure to distinguish between { and } embedded
// within what we have assumed to be literals in the action code, the
// job of the lexer is merely to gather the code within the action
// (delimited by {}) and pass it to the parser as a single token.
// We know that this token will be asked for its text somewhere
// in the upcoming parse, so setting the text here to exclude
// the delimiting {} is no additional overhead.
//
ACTION
 : NESTED_ACTION
 ( '?' {$type = SEMPRED;}
   ( (WSNLCHARS* '=>') => WSNLCHARS* '=>' // v3 gated sempred
     {
     Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
     t.setLine(state.tokenStartLine);
     t.setText(state.text);
     t.setCharPositionInLine(state.tokenStartCharPositionInLine);
     grammarError(ErrorType.V3_GATED_SEMPRED, t);
     }
   )?
 )?
 ;

// ----------------
```

```
// Action structure
//
// Many language targets use {} as block delimiters and so we
// must recursively match {} delimited blocks to balance the
// braces. Additionally, we must make some assumptions about
// literal string representation in the target language. We assume
// that they are delimited by ' or " and so consume these
// in their own alts so as not to inadvertantly match {}.
// This rule calls itself on matching a {
//
fragment
NESTED_ACTION
@init {

 // Record the start line and offsets as if we need to report an
 // unterminated block, then we want to show the start of the comment
 // we think is broken, not the end, where people will have to try and work
 // it out themselves.
 //
 int startLine = getLine();
 int offset    = getCharPositionInLine();
}

  : // Action and other blocks start with opening {
    //
  '{'
   (
    // And now we can match one of a number of embedded
    // elements within the action until we find a
    // } that balances the opening {. If we do not find
    // the balanced } then we will hit EOF and can issue
    // an error message about the brace that we belive to
    // be mismatched. This won't be foolproof but we will
    // be able to at least report an error against the
    // opening brace that we feel is in error and this will
    // guide the user to the correction as best we can.
    //


      // An embedded {} block
     //
     NESTED_ACTION

    | // What appears to be a literal
      //
      ACTION_CHAR_LITERAL

     | // We have assumed that the target language has C/Java
```

```
        // type comments.
        //
        COMMENT

    | // What appears to be a literal
        //
        ACTION_STRING_LITERAL

    | // What appears to be an escape sequence
        //
        ACTION_ESC

    | // Some other single character that is not
        // handled above
        //
        ~('\\'|'"'|'\''|'/'|'{'|'}')

    )*

(
    // Correctly balanced closing brace
    //
    '}'

  | // Looks like have an imblanced {} block, report
    // with respect to the opening brace.
    //
    {
        // TODO: Report imbalanced {}
        System.out.println("Block starting  at line " + startLine + " offset " + (offset+1) + " contains imbalanced {} or
is missing a }");
    }
)
 ;



// Keywords
// --------
// keywords used to specify ANTLR v3 grammars. Keywords may not be used as
// labels for rules or in any other context where they would be ambiguous
// with the keyword vs some other identifier
// OPTIONS, TOKENS, and CHANNELS must also consume the opening brace that captures
// their option block, as this is the easiest way to parse it separate
// to an ACTION block, despite it using the same {} delimiters.
//
OPTIONS      : 'options'  WSNLCHARS* '{'  ;
TOKENS_SPEC  : 'tokens'   WSNLCHARS* '{'  ;
CHANNELS     : 'channels' WSNLCHARS* '{'  ;
```

```
IMPORT      : 'import'          ;
FRAGMENT    : 'fragment'        ;
LEXER       : 'lexer'           ;
PARSER      : 'parser'          ;
GRAMMAR     : 'grammar'         ;
TREE_GRAMMAR : 'tree' WSNLCHARS* 'grammar' ;
PROTECTED   : 'protected'       ;
PUBLIC      : 'public'          ;
PRIVATE     : 'private'         ;
RETURNS     : 'returns'         ;
LOCALS      : 'locals'          ;
THROWS      : 'throws'          ;
CATCH       : 'catch'           ;
FINALLY     : 'finally'         ;
MODE        : 'mode'            ;


// -----------
// Punctuation
//
// Character sequences used as separators, delimters, operators, etc
//
COLON       : ':'
        {
        // scan backwards, looking for a RULE_REF or TOKEN_REF.
        // which would indicate the start of a rule definition.
        // If we see a LPAREN, then it's the start of the subrule.
        // this.tokens is the token string we are pushing into, so
        // just loop backwards looking for a rule definition. Then
        // we set isLexerRule.
        Token t = getRuleOrSubruleStartToken();
        if ( t!=null ) {
            if ( t.getType()==RULE_REF ) isLexerRule = false;
            else if ( t.getType()==TOKEN_REF ) isLexerRule = true;
            // else must be subrule; don't alter context
        }
        }
      ;
COLONCOLON  : '::'              ;
COMMA       : ','              ;
SEMI        : ';'              ;
LPAREN      : '('              ;
RPAREN      : ')'              ;
RARROW      : '->'             ;
LT          : '<'              ;
GT          : '>'              ;
ASSIGN      : '='              ;
QUESTION    : '?'              ;
```

```
SYNPRED    : '=>'
    {
    Token t = new CommonToken(input, state.type, state.channel,
                    state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_SYNPRED, t);
        $channel=HIDDEN;
    }
        ;
STAR        : '*'            ;
PLUS        : '+'            ;
PLUS_ASSIGN  : '+='             ;
OR          : '|'            ;
DOLLAR      : '$'             ;
DOT        : '.'             ; // can be WILDCARD or DOT in qid or imported rule ref
RANGE       : '..'            ;
AT         : '@'            ;
POUND       : '#'            ;
NOT        : '~'            ;
RBRACE      : '}'             ;

/** Allow unicode rule/token names */
ID   : a=NameStartChar NameChar*
  {
  if ( Grammar.isTokenName($a.text) ) $type = TOKEN_REF;
  else $type = RULE_REF;
  }
 ;

fragment
NameChar   :  NameStartChar
      |  '0'..'9'
      |  '_'
      |  '\u00B7'
      |  '\u0300'..'\u036F'
      |  '\u203F'..'\u2040'
      ;

fragment
NameStartChar
      :  'A'..'Z' | 'a'..'z'
      |  '\u00C0'..'\u00D6'
      |  '\u00D8'..'\u00F6'
      |  '\u00F8'..'\u02FF'
      |  '\u0370'..'\u037D'
      |  '\u037F'..'\u1FFF'
```

```
        |  '\u200C'..'\u200D'
        |  '\u2070'..'\u218F'
        |  '\u2C00'..'\u2FEF'
        |  '\u3001'..'\uD7FF'
        |  '\uF900'..'\uFDCF'
        |  '\uFDF0'..'\uFEFE'
        |  '\uFF00'..'\uFFFD'
        ; // ignores | ['\u10000-'\uEFFFF] ;


// ----------------------------
// Literals embedded in actions
//
// Note that we have made the assumption that the language used within
// actions uses the fairly standard " and ' delimiters for literals and
// that within these literals, characters are escaped using the \ character.
// There are some languages which do not conform to this in all cases, such
// as by using /string/ and so on. We will have to deal with such cases if
// if they come up in targets.
//

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal characters. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically. While this rule is called CHAR it allows for the fact that
// some languages may use/allow ' as the string delimiter.
//
fragment
ACTION_CHAR_LITERAL
 : '\'' (('\\')=>ACTION_ESC | ~'\'' )* '\''
 ;

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal strings. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically.
//
fragment
ACTION_STRING_LITERAL
 : '"' (('\\')=>ACTION_ESC | ~'"')* '"'
 ;

// Within literal strings and characters that are not part of the ANTLR
// syntax, we must allow for escaped character sequences so that we do not
// inadvertantly recognize the end of a string or character when the terminating
// delimiter has been esacped.
//
fragment
ACTION_ESC
```

```
    : '\\' .
    ;


// -------
// Integer
//
// Obviously (I hope) match an aribtrary long sequence of digits.
//
INT : ('0'..'9')+
    ;


// -----------
// Source spec
//
// A fragment rule for picking up information about an origrinating
// file from which the grammar we are parsing has been generated. This allows
// ANTLR to report errors against the originating file and not the generated
// file.
//
fragment
SRC : 'src' WSCHARS+ file=ACTION_STRING_LITERAL WSCHARS+ line=INT
    {
        // TODO: Add target specific code to change the source file name and current line number
        //
    }
    ;


// --------------
// Literal string
//
// ANTLR makes no disticintion between a single character literal and a
// multi-character string. All literals are single quote delimited and
// may contain unicode escape sequences of the form \uxxxx, where x
// is a valid hexadecimal number (as per Java basically).
STRING_LITERAL
    : '\'' ( ( ESC_SEQ | ~('\\'|'\''|'\r'|'\n') ) )*
      (   '\''
      |   // Unterminated string literal
          {
          Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
          t.setLine(state.tokenStartLine);
          t.setText(state.text);
          t.setCharPositionInLine(state.tokenStartCharPositionInLine);
          grammarError(ErrorType.UNTERMINATED_STRING_LITERAL, t);
          }
      )
    ;
```

```
// A valid hex digit specification
//
fragment
HEX_DIGIT : ('0'..'9'|'a'..'f'|'A'..'F') ;

// Any kind of escaped character that we can embed within ANTLR
// literal strings.
//
fragment
ESC_SEQ
  : '\\'
    (
        // The standard escaped character set such as tab, newline,
        // etc.
        //
    'b'|'t'|'n'|'f'|'r'|'\"'|'\''|'\\'

      | // A Java style Unicode escape sequence
        //
        UNICODE_ESC

      | // An illegal escape seqeunce
        //
        {
          Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-1, getCharIndex());
          t.setText(t.getText());
          t.setLine(input.getLine());
          t.setCharPositionInLine(input.getCharPositionInLine()-1);
          grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t);
        }
    )
  ;

fragment
UNICODE_ESC

@init {

// Flag to tell us whether we have a valid number of
// hex digits in the escape sequence
//
int hCount = 0;
}
  :  'u' // Leadin for unicode escape sequence

    // We now require 4 hex digits. Note though
    // that we accept any number of characters
    // and issue an error if we do not get 4. We cannot
```

```
      // use an inifinite count such as + because this
      // might consume too many, so we lay out the lexical
      // options and issue an error at the invalid paths.
      //
   (
     (
       HEX_DIGIT  { hCount++; }
        (
            HEX_DIGIT  { hCount++; }
          (
            HEX_DIGIT  { hCount++; }
            (
               // Four valid hex digits, we are good
               //
               HEX_DIGIT { hCount++; }

               | // Three valid digits
             )

           | // Two valid digits
          )

         | // One valid digit
       )
        )
      | // No valid hex digits at all
   )

   // Now check the digit count and issue an error if we need to
   //
   {
   if (hCount != 4) {
        Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-3-hCount, getCharIndex()-
1);
        t.setText(t.getText());
        t.setLine(input.getLine());
        t.setCharPositionInLine(input.getCharPositionInLine()-hCount-2);
        grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t);
   }
   }
 ;


// ----------
// Whitespace
//
// Characters and character constructs that are of no import
// to the parser and are used to make the grammar easier to read
// for humans.
```

```
//
WS
  : (
    ' '
    | '\t'
    | '\r'
    | '\n'
    | '\f'
  )+
  {$channel=HIDDEN;}
  ;


// A fragment rule for use in recognizing end of line in
// rules like COMMENT.
//
fragment
NLCHARS
  : '\n' | '\r'
  ;


// A fragment rule for recognizing traditional whitespace
// characters within lexer rules.
//
fragment
WSCHARS
  : ' ' | '\t' | '\f'
  ;


// A fragment rule for recognizing both traditional whitespace and
// end of line markers, when we don't care to distinguish but don't
// want any action code going on.
//
fragment
WSNLCHARS
  : ' ' | '\t' | '\f' | '\n' | '\r'
  ;


// This rule allows ANTLR 4 to parse grammars using the UTF-8 encoding with a
// byte order mark. Since this Unicode character doesn't appear as a token
// anywhere else in the grammar, we can simply skip all instances of it without
// problem. This rule will not break usage of \uFEFF inside a LEXER_CHAR_SET or
// STRING_LITERAL.
UnicodeBOM
  :  '\uFEFF' {skip();}
  ;


// -----------------
// Illegal Character
```

```
//
// This is an illegal character trap which is always the last rule in the
// lexer specification. It matches a single character of any value and being
// the last rule in the file will match when no other rule knows what to do
// about the character. It is reported as an error but is not passed on to the
// parser. This means that the parser to deal with the gramamr file anyway
// but we will not try to analyse or code generate from a file with lexical
// errors.
//
ERRCHAR
  : .
    {
      Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
      t.setLine(state.tokenStartLine);
      t.setText(state.text);
      t.setCharPositionInLine(state.tokenStartCharPositionInLine);
      String msg = getTokenErrorDisplay(t) + " came as a complete surprise to me";
      grammarError(ErrorType.SYNTAX_ERROR, t, msg);
      state.syntaxErrors++;
      skip();
    }
  ;
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/ANTLRLexer.g
No license file was found, but licenses were detected in source scan.

```
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 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

SwiftTypeInitMap ::= [
 "Int":"0",
 "Int64":"0",
 "Float":"0.0",
 "Double":"0.0",
 "Bool":"false",
 default:"nil" // anything other than a primitive type is an object
]
SwiftTypeMap ::= [
 "int":"Int",
 "float":"Float",
 "long":"Int64",
 "double":"Double",
 "bool":"Bool",
 "boolean":"Bool",
 default : key
]
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions,contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4
```

```
/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
public protocol <file.grammarName>Listener: ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>

import Antlr4


/**
 * This class provides an empty implementation of {@link <file.grammarName>Listener},
 * which can be extended to create a listener which only needs to handle a subset
 * of the available methods.
 */
open class <file.grammarName>BaseListener: <file.grammarName>Listener {
  public init() { \}
```

```
 <file.listenerNames:{lname |

/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
open func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
open func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) { \}};
separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 open func enterEveryRule(_ ctx: ParserRuleContext) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 open func exitEveryRule(_ ctx: ParserRuleContext) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 open func visitTerminal(_ node: TerminalNode) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 open func visitErrorNode(_ node: ErrorNode) { }
}
>>

VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
```

```
<header>
import Antlr4

/**
 * This interface defines a complete generic visitor for a parse tree produced
 * by {@link <file.parserName>}.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
open class <file.grammarName>Visitor\<T>: ParseTreeVisitor\<T> {
  <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
 * Visit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
 * Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
  - ctx: the parse tree
 - returns: the visitor result
 */
open func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) -> T{
  fatalError(#function + " must be overridden")
\}
}; separator="\n">
}
>>

BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
 * This class provides an empty implementation of {@link <file.grammarName>Visitor},
 * which can be extended to create a visitor which only needs to handle a subset
 * of the available methods.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
open class <file.grammarName>BaseVisitor\<T>: AbstractParseTreeVisitor\<T> {
  <file.visitorNames:{lname |
```

```
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
open func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context) -> T? { return
visitChildren(ctx) \}}; separator="\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<!//@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})!>
open class <parser.name>: <superClass; null="Parser"> {

 internal static var _decisionToDFA: [DFA] = {
      var decisionToDFA = [DFA]()
      let length = <parser.name>._ATN.getNumberOfDecisions()
      for i in 0..\<length {
       <!// decisionToDFA[i] = DFA(<parser.name>._ATN.getDecisionState(i)!, i);!>
        decisionToDFA.append(DFA(<parser.name>._ATN.getDecisionState(i)!, i))
       }
       return decisionToDFA
   }()
 internal static let _sharedContextCache: PredictionContextCache = PredictionContextCache()
 <if(parser.tokens)>
 public enum Tokens: Int {
  case EOF = -1, <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
 }
     <endif>
 public static let <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>
 public static let ruleNames: [String] = [
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 ]

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 override
 open func getGrammarFileName() -> String { return "<parser.grammarFileName; format="java-escape">" }
```

```
 override
 open func getRuleNames() -> [String] { return <parser.name>.ruleNames }

 override
 open func getSerializedATN() -> String { return <parser.name>._serializedATN }

 override
 open func getATN() -> ATN { return <parser.name>._ATN }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
  override
 open func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int, _ predIndex: Int)throws -> Bool {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case  <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
    default: return true
  }
  <!return true;!>
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
 public static let _serializedATN : String = <parser.name>ATN().jsonString
 public static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
private static let _LITERAL_NAMES: [String?] = [
 <literalNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
private static let _SYMBOLIC_NAMES: [String?] = [
 <symbolicNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
]
public static let VOCABULARY: Vocabulary = Vocabulary(_LITERAL_NAMES, _SYMBOLIC_NAMES)

/**
 * @deprecated Use {@link #VOCABULARY} instead.
 */
//@Deprecated
public let tokenNames: [String?]? = {
  let length = _SYMBOLIC_NAMES.count
```

```
   var tokenNames = [String?](repeating: nil, count: length)
  for i in 0..\<length {
   var name = VOCABULARY.getLiteralName(i)
   if name == nil {
    name = VOCABULARY.getSymbolicName(i)
   }
   if name == nil {
    name = "\<INVALID>"
   }
   tokenNames[i] = name
  }
  return tokenNames
 }()


 override
 <!//@Deprecated!>
 open func getTokenNames() -> [String?]? {
  return tokenNames
 }
 >>


dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
override
open func action(_ _localctx: RuleContext?,  _ ruleIndex: Int, _ actionIndex: Int) throws {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((_localctx as <f.ctxType>?), actionIndex)
  }; separator="\n">
 default: break
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
override
open func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int,_  predIndex: Int) throws -> Bool{
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
 default: return true
 }
 <!return true;!>
 }
<sempredFuncs.values; separator="\n">
<endif>
```

```
>>

parser_ctor(p) ::= <<

open override func getVocabulary() -> Vocabulary {
  return <p.name>.VOCABULARY
}

public override init(_ input:TokenStream)throws {
  RuntimeMetaData.checkVersion("4.6", RuntimeMetaData.VERSION)
 try super.init(input)
 _interp = ParserATNSimulator(self,<p.name>._ATN,<p.name>._decisionToDFA,
<parser.name>._sharedContextCache)
}
>>

/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private func <r.name>_action(_ _localctx: <r.ctxType>?,  _ actionIndex: Int) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
  }; separator="\n">
  default: break
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private func <r.name>_sempred(_ _localctx: <r.ctxType>!,  _ predIndex: Int) throws -> Bool {
 switch (predIndex) {
 <actions:{index|
  case <index>:return <actions.(index)>}; separator="\n">
    default: return true
 }
 <!return true;!>
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<
<ruleCtx>
```

```
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
@discardableResult
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>open func
<endif><currentRule.name>(<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType> {
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>)
 try enterRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>)
 <namedActions.init>
 <locals; separator="\n">
 defer {
    <finallyAction>
    try! exitRule()
  }
 do {
<if(currentRule.hasLookaheadBlock)>
 var _alt:Int
<endif>
  <code>
 <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
<exceptions; separator="\n">
<else>
 catch ANTLRException.recognition(let re) {
 _localctx.exception = re
 _errHandler.reportError(self, re)
 try _errHandler.recover(self, re)
 }
 <endif>

 return _localctx
 }
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif> func <currentRule.name>(
<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType>  {
 return try <currentRule.name>(0<currentRule.args:{a | , <a.name>}>)
}
@discardableResult
private func <currentRule.name>(_ _p<args:{a | , <a>}>: Int) throws -> <currentRule.ctxType>  {
```

```
 let _parentctx: ParserRuleContext? = _ctx
 var _parentState: Int = getState()
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>)
 var _prevctx: <currentRule.ctxType> = _localctx
 var _startState: Int = <currentRule.startState>
 try enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p)
 <namedActions.init>
 <locals; separator="\n">
 defer {
    <finallyAction>
    try! unrollRecursionContexts(_parentctx)
  }
 do {
<if(currentRule.hasLookaheadBlock)>
 var _alt: Int
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch ANTLRException.recognition(let re) {
 _localctx.exception = re
 _errHandler.reportError(self, re)
 try _errHandler.recover(self, re)
 }

 return _localctx;
 }
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx =  <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
try enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<!//{!>
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
<!//}!>
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
```

```
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt | <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>) <! alt block decision !>
```

```
try _errHandler.sync(self)
<preamble; separator="\n">
repeat {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 <iteration>
} while (<loopExpr>)
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch(try getInterpreter().adaptivePredict(_input,<choice.decision>, _ctx)) {
<alts:{alt |
case <i>:
 <alt>
 break}; separator="\n">
default: break
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
default: break
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
_alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
while (_alt != <choice.exitAlt> && _alt != ATN.INVALID_ALT_NUMBER) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>)
```

```
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
}
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
try _errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
repeat {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
} while (_alt != <choice.exitAlt> && _alt !=  ATN.INVALID_ALT_NUMBER)
>>


Sync(s) ::= "sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw try ANTLRException.recognition(e: NoViableAltException(self))"


TestSetInline(s) ::= <<
<!<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">!>
//closure
{ () -> Bool in
    <if(rest(s.bitsets))>var<else>let<endif> testSet: Bool = <first(s.bitsets):{bits |
<if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}>
      <rest(s.bitsets):{bits | testSet = testSet || <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s,
bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator="\n">
    return testSet
}()
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
```

```
<!(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1 \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1 \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)!>
{  () -> Bool in
  <! let test: Bool = (<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>)!>
  <!var temp: Int64 =  Int64(<offsetShift(s.varName, bits.shift)>)!>
  <!temp = (temp \< 0) ? (64 + (temp % 64 )) : (temp % 64)!>
  <!let test1: Int64 = (Int64(1) \<\< temp)!>
  <!var test2: Int64 = (<first(bits.ttypes):{ttype | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)}>)!>
  <!<rest(bits.ttypes):{ttype | test2 = test2 | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)};
separator="\n">!>
  let testArray: [Int] = [<s.varName>, <bits.ttypes:{ttype |<parserName(ttype)>}; separator=",">]
  <!var test2: Int64 = Utils.testBitLeftShiftArray(testArray)!>
   return  Utils.testBitLeftShiftArray(testArray, <bits.shift>)
}()
>>


isZero ::= [
"0": true,
default: false
]
parserName(ttype) ::= <%
<parser.name>.Tokens.<ttype>.rawValue
%>
offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName> == <parser.name>.Tokens.<ttype>.rawValue}; separator=" || ">
%>


cases(ttypes) ::= <<
<trunc(ttypes): {t | case .<t>:fallthrough} ; separator="\n">
<last(ttypes): {t | case .<t>:} ; separator="\n">
>>


InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>)
<if(r.labels)>
try {
 let assignmentValue = try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
 <r.labels:{l | <labelref(l)> = assignmentValue} ; separator="\n">
   }()
<else>try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)<endif>
>>
```

```
MatchToken(m) ::= <<
setState(<m.stateNumber>)
<if(m.labels)>
try {
  let assignmentValue = try match(<parser.name>.Tokens.<m.name>.rawValue)
  <m.labels:{l | <labelref(l)> = assignmentValue}  ; separator="\n">
    }()
<else>try match(<parser.name>.Tokens.<m.name>.rawValue)<endif>
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>)
<if(m.labels)><m.labels:{l | <labelref(l)> = }>try _input.LT(1)<endif>
<capture>
if (<if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>)) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>try _errHandler.recoverInline(self)<if(m.labels)> as
Token<endif>
}
else {
 _errHandler.reportMatch(self)
 try consume()
}
>>


Wildcard(w) ::= <<
setState(<w.stateNumber>)
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>try matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>)
if (!(<chunks>)) {
  throw try ANTLRException.recognition(e:FailedPredicateException(self, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>))
}
>>
```

```
ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>


// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip()"
LexerMoreCommand()  ::= "more()"
LexerPopModeCommand() ::= "popMode()"


LexerTypeCommand(arg)     ::= "_type = <arg>"
LexerChannelCommand(arg)   ::= "_channel = <arg>"
LexerModeCommand(arg)     ::= "_mode = <arg>"
LexerPushModeCommand(arg)  ::= "pushMode(<arg>)"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"


TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getText()! : \"\")"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getCharPositionInLine() : 0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> != nil ? Int(<ctx(t)>.<t.label>!.getText()!) : 0)"


RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.start?.description ?? \"\") : \"\")"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.stop?.description ?? \"\") : \"\")"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label> != nil ? try
_input.getText(<ctx(r)>.<r.label>!.start,<ctx(r)>.<r.label>!.stop) : \"\")"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"


ThisRulePropertyRef_start(r) ::= "_localctx.start"
```

ThisRulePropertyRef_stop(r) ::= "_localctx.stop"
ThisRulePropertyRef_text(r) ::= "(try _input.getText(_localctx.start, try _input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s) ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "<t.name>: <SwiftTypeMap.(TokenLabelType())>!"
TokenTypeDecl(t) ::= "var <t.name>: Int = 0"
TokenListDecl(t) ::= "<t.name>: Array\<Token> = Array\<Token>()"
RuleContextDecl(r) ::= "<r.name>: <r.ctxName>!"
RuleContextListDecl(rdecl) ::= "<rdecl.name>:Array\<<rdecl.ctxName>> = Array\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)   ::=
  "open func <t.name>() -> TerminalNode? { return getToken(<parser.name>.Tokens.<t.name>.rawValue, 0) }"
ContextTokenListGetterDecl(t) ::=
  "open func <t.name>() -> Array\<TerminalNode> { return getTokens(<parser.name>.Tokens.<t.name>.rawValue)
}"
ContextTokenListIndexedGetterDecl(t) ::= <<
open func <t.name>(_ i:Int) -> TerminalNode?{
 return getToken(<parser.name>.Tokens.<t.name>.rawValue, i)
}
>>
ContextRuleGetterDecl(r)   ::= <<
open func <r.name>() -> <r.ctxName>? {
 return getRuleContext(<r.ctxName>.self,0)
}
>>
ContextRuleListGetterDecl(r) ::= <<
open func <r.name>() -> Array\<<r.ctxName>\> {
 return getRuleContexts(<r.ctxName>.self)
}
>>
ContextRuleListIndexedGetterDecl(r) ::= <<
open func <r.name>(_ i: Int) -> <r.ctxName>? {
 return getRuleContext(<r.ctxName>.self,i)
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */

```
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = try _input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = try _input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
        superClass={ParserRuleContext}) ::= <<
open class
<struct.name>:<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>,
<interfaces; separator=", "><endif> {
 <attrs:{a | public var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <! <if(ctorAttrs)>public init(_ parent: ParserRuleContext,_ invokingState: Int) { super.init(parent, invokingState)
}<endif> !>
 <if(ctorAttrs)>
 public convenience init(_ parent: ParserRuleContext?, _ invokingState: Int<ctorAttrs:{a | , _ <a>}>) {
 self.init(parent, invokingState)
 <struct.ctorAttrs:{a | self.<a.name> = <a.name>;}; separator="\n">
 }
<endif>
 open override func getRuleIndex() -> Int { return <parser.name>.RULE_<struct.derivedFromName> }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 <!public init() { }!>
 public  func copyFrom(_ ctx: <struct.name>) {
 super.copyFrom(ctx)
 <struct.attrs:{a | self.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public  final class <struct.name>: <currentRule.name; format="cap">Context {
 <attrs:{a | public var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public init(_ ctx: <currentRule.name; format="cap">Context) {
 super.init()
 copyFrom(ctx)
 }
 <dispatchMethods; separator="\n">
}
```

```
>>

ListenerDispatchMethod(method) ::= <<
override
open func <if(method.isEnter)>enter<else>exit<endif>Rule(_ listener: ParseTreeListener) {
 if listener is <parser.grammarName>Listener {
   (listener as!
<parser.grammarName>Listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(self)
 }
}
>>

VisitorDispatchMethod(method) ::= <<
override
open func accept\<T>(_ visitor: ParseTreeVisitor\<T>) -> T? {
 if visitor is <parser.grammarName>Visitor {
    return (visitor as! <parser.grammarName>Visitor\<T>).visit<struct.derivedFromName; format="cap">(self)
 }else if visitor is <parser.grammarName>BaseVisitor {
   return (visitor as! <parser.grammarName>BaseVisitor\<T>).visit<struct.derivedFromName; format="cap">(self)
  }
 else {
    return visitor.visitChildren(self)
 }
}
>>

AttributeDecl(d) ::= "<d.name>: <SwiftTypeMap.(d.type)><if(d.initValue)> = <d.initValue><else>!<endif>"

/** If we don't know location of label def x, use this template (_localctx as! <x.ctx.name> */
labelref(x) ::= "<if(!x.isLocal)>_localctx.castdown(<x.ctx.name>.self).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr?    */
ctx(actionChunk) ::= "_localctx.castdown(<actionChunk.ctx.name>.self)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "_ctx!.stop = try _input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.append(_prevctx)
<else>
_localctx.<label> = _prevctx
<endif>
```

```
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>


recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = <currentAltLabel; format="cap">Context(  <ruleName; format="cap">Context(_parentctx,
_parentState))
<if(label)>
<if(isListLabel)>
(_localctx as! <currentAltLabel; format="cap">Context).<label>.append(_prevctx)
<else>
(_localctx as! <currentAltLabel; format="cap">Context).<label> = _prevctx
<endif>
<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>


recRuleReplaceContext(ctxName) ::= <<
_localctx = <ctxName>Context(_localctx)
_ctx = _localctx
_prevctx = _localctx
>>


recRuleSetPrevCtx() ::= <<
if _parseListeners != nil {
  try triggerExitRuleEvent()
}
_prevctx = _localctx
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
<!package <lexerFile.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4

<lexer>
>>
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
open class <lexer.name>: <superClass; null="Lexer"> {
 internal static var _decisionToDFA: [DFA] = {
      var decisionToDFA = [DFA]()
      let length = <lexer.name>._ATN.getNumberOfDecisions()
      for i in 0..\<length {
```

```
      <! decisionToDFA[i] = DFA(<lexer.name>._ATN.getDecisionState(i)!, i);!>
        decisionToDFA.append(DFA(<lexer.name>._ATN.getDecisionState(i)!, i))
    }
    return decisionToDFA
  }()

internal static let _sharedContextCache:PredictionContextCache = PredictionContextCache()
public static let <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>
<if(lexer.channels)>
  public let <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>
<endif>
<rest(lexer.modes):{m| public static let <m>: Int = <i>;}; separator="\n">
public static let modeNames: [String] = [
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
]

public static let ruleNames: [String] = [
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

<namedActions.members>
  open override func getVocabulary() -> Vocabulary {
     return <lexer.name>.VOCABULARY
  }

public override init(_ input: CharStream) {
   RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION)
 super.init(input)
 _interp = LexerATNSimulator(self, <lexer.name>._ATN, <lexer.name>._decisionToDFA,
<lexer.name>._sharedContextCache)
 }

override
open func getGrammarFileName() -> String { return "<lexer.grammarFileName>" }

  override
open func getRuleNames() -> [String] { return <lexer.name>.ruleNames }

override
open func getSerializedATN() -> String { return <lexer.name>._serializedATN }

override
open func getModeNames() -> [String] { return <lexer.name>.modeNames }

override
open func getATN() -> ATN { return <lexer.name>._ATN }
```

```
<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
   public static let _serializedATN: String = <lexer.name>ATN().jsonString
public static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>


/** Don't need to define anything. The tool generates a XParserATN.swift file (and same for lexer)
 *  which is referenced from static field _serializedATN.  This json string is passed to
 *  deserializeFromJson(). Note this is not the "serialization as array of ints" that other targets
 *  do. It is more or less the output of ATNPrinter which gets read back in.
 */
SerializedATN(model) ::= <<
>>


/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<SwiftTypeInitMap.(typeName)>
>>


codeFileExtension() ::= ".swift"
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/Swift/Swift.stg
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 *  Copyright (c) 2012-2016 Terence Parr
 *  Copyright (c) 2012-2016 Sam Harwell
 *  Copyright (c) 2014 Eric Vergnaud
 *  All rights reserved.
 *
 *  Redistribution and use in source and binary forms, with or without
 *  modification, are permitted provided that the following conditions
 *  are met:
 *
 *  1. Redistributions of source code must retain the above copyright
 *     notice, this list of conditions and the following disclaimer.
 *  2. Redistributions in binary form must reproduce the above copyright
 *     notice, this list of conditions and the following disclaimer in the
 *     documentation and/or other materials provided with the distribution.
 *  3. The name of the author may not be used to endorse or promote products
 *     derived from this software without specific prior written permission.
```

```
/** ANTLR tool checks output templates are compatible with tool code generation.
 * For now, a simple string match used on x.y of x.y.z scheme.
 * Must match Tool.VERSION during load to templates.
 *
 * REQUIRED.
 */

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from antlr4 import *
from io import StringIO

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
```

```
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

    <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    pass

}; separator="\n">

>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
    from .<file.parserName> import <file.parserName>
else:
    from <file.parserName> import <file.parserName>
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
    return self.visitChildren(ctx)

}; separator="\n">

del <file.parserName>
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
```

```
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
from .<superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

  grammarFileName = "<parser.grammarFileName>"

  atn = ATNDeserializer().deserialize(serializedATN())

  decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

  sharedContextCache = PredictionContextCache()

  literalNames = [ <parser.literalNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

  ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

  EOF = <TokenLabelType()>.EOF
<if(parser.tokens)>
<parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
<endif>

  <parser:(ctor)()>

  <namedActions.members>

  <funcs; separator="\n">


<if(sempredFuncs)>
  def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
    if self._predicates == None:
      self._predicates = dict()
<parser.sempredFuncs.values:{f |
    self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
    pred = self._predicates.get(ruleIndex, None)
    if pred is None:
```

```
        raise Exception("No predicate with index:" + str(ruleIndex))
    else:
        return pred(localctx, predIndex)


  <sempredFuncs.values; separator="\n">
<endif>




>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx:RuleContext, ruleIndex:int, actionIndex:int):
 if self._actions is None:
  actions = dict()
<recog.actionFuncs.values:{f|
 actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
 self._actions = actions
 action = self._actions.get(ruleIndex, None)
 if action is not None:
  action(localctx, actionIndex)
 else:
  raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
   if self._predicates is None:
      preds = dict()
<recog.sempredFuncs.values:{f|
     preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
     self._predicates = preds
   pred = self._predicates.get(ruleIndex, None)
   if pred is not None:
      return pred(localctx, predIndex)
   else:
      raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
def __init__(self, input:TokenStream):
  super().__init__(input)
```

```
self.checkVersion("<file.ANTLRVersion>")
self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
self._predicates = None


>>

/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx:<r.ctxType> , actionIndex:int):
<actions:{index|
<if(first(actions))>
  if actionIndex == <index>:
     <actions.(index)>
<elseif(rest(actions))>
  elif actionIndex == <index>:
     <actions.(index)>
<endif> }; separator="\n">
>>

/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx:<r.ctxType>, predIndex:int):
   <actions:{index|
<if(first(actions))>
  if predIndex == <index>:
     return <actions.(index)>
<elseif(rest(actions))>
  elif predIndex == <index>:
     return <actions.(index)>
<endif> }; separator="\n">


>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name><if(a.type)>:<a.type><endif>}>):

  localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
```

```
  self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
  <namedActions.init>
  <locals; separator="\n">
  try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  except RecognitionException as re:
      localctx.exception = re
      self._errHandler.reportError(self, re)
      self._errHandler.recover(self, re)
  <endif>
  finally:
      <finallyAction>
      self.exitRule()
  return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p:int=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
  _parentctx = self._ctx
  _parentState = self.state
  localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
  _prevctx = localctx
  _startState = <currentRule.startState>
  self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
  <namedActions.init>
  <locals; separator="\n">
  try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
  except RecognitionException as re:
      localctx.exception = re
      self._errHandler.reportError(self, re)
      self._errHandler.recover(self, re)
  finally:
      <finallyAction>
```

```
        self.unrollRecursionContexts(_parentctx)
    return localctx

>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>


LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
```

```
    <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
    <alts; separator="\n">
    self.state = <choice.loopBackStateNumber>
    self._errHandler.sync(self)
    <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
    <alts; separator="\n">
    self.state = <choice.stateNumber> <! loopback/exit decision !>
    self._errHandler.sync(self)
    <iteration>
    if not (<loopExpr>):
        break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
    <alt>
    pass
}; separator="\nel">

>>
```

```
OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">

>>


StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   if _alt==1<if(!choice.ast.greedy)>+1<endif>:
      <iteration>
      <alts> <! should only be one !>
   self.state = <choice.loopBackStateNumber>
   self._errHandler.sync(self)
   _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>


PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">
   else:
      <error>
   self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
   self._errHandler.sync(self)
   _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
```

```
bits)><endif>}; separator=" or ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})>) and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>


cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>


InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>


MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>
```

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l | <labelref(l)> = }><else>   <endif>self._errHandler.recoverInline(self)
else:
  self._errHandler.reportMatch(self)
  self.consume()
>>

Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
  from antlr4.error.Errors import FailedPredicateException
  raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>, <p.msg><endif>)
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand() ::= "skip()"
LexerMoreCommand() ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)   ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"

```
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar) ::= "pushMode(<arg>)"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"


TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type())"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"


RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText((<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"


ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText((localctx.start, self._input.LT(-1)))"
ThisRulePropertyRef_ctx(r)   ::= "localctx"
ThisRulePropertyRef_parser(r)  ::= "self"


NonLocalAttrRef(s)      ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"


AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"


TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
```

RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

```
ContextTokenGetterDecl(t)     ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>
```

```
// should never be called
ContextTokenListGetterDecl(t)  ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>
```

```
ContextTokenListIndexedGetterDecl(t)  ::= <<
def <t.name>(self, i:int=None):
  if i is None:
      return self.getTokens(<parser.name>.<t.name>)
  else:
      return self.getToken(<parser.name>.<t.name>, i)
>>
```

```
ContextRuleGetterDecl(r)     ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>
```

```
// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>
```

```
ContextRuleListIndexedGetterDecl(r)  ::= <<
def <r.name>(self, i:int=None):
  if i is None:
      return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
  else:
      return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>
```

LexerRuleContext() ::= "RuleContext"

```
/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
```

```
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

    def __init__(self, parser, parent:ParserRuleContext=None, invokingState:int=-1<struct.ctorAttrs:{a | ,
<a.name><if(a.type)>:<a.type><endif>=None}>):
        super().__init__(parent, invokingState)
        self.parser = parser
        <attrs:{a | <a>}; separator="\n">
        <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

    <getters:{g | <g>}; separator="\n\n">

    def getRuleIndex(self):
        return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
    def copyFrom(self, ctx:ParserRuleContext):
        super().copyFrom(ctx)
        <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
    <dispatchMethods; separator="\n">
    <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

    def __init__(self, parser, ctx:ParserRuleContext): # actually a <parser.name>.<currentRule.name;
format="cap">Context
        super().__init__(parser)
        <attrs:{a | <a>}; separator="\n">
        self.copyFrom(ctx)

    <getters:{g | <g>}; separator="\n">

    <dispatchMethods; separator="\n">
```

```
>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener:ParseTreeListener):
  if hasattr( listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">" ):
    listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor:ParseTreeVisitor):
  if hasattr( visitor, "visit<struct.derivedFromName; format="cap">" ):
    return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
    return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
```

```
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
    self.triggerExitRuleEvent()
_prevctx = localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
from antlr4 import *
from io import StringIO

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<

<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

    <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

    modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ]

    literalNames = [ "\<INVALID>",
            <lexer.literalNames:{t | <t>}; separator=", ", wrap, anchor> ]

    symbolicNames = [ "\<INVALID>",
            <lexer.symbolicNames:{t | <t>}; separator=", ", wrap, anchor> ]
```

```
    ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    grammarFileName = "<lexer.grammarFileName>"

    def __init__(self, input=None):
        super().__init__(input)
        self.checkVersion("<lexerFile.ANTLRVersion>")
        self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
        self._actions = None
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
    with StringIO() as buf:
        buf.write("<model.serialized; wrap={")<\n>        buf.write("}>")
        return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
jar/org/antlr/v4/tool/templates/codegen/Python3/Python3.stg
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/** How to generate rules derived from left-recursive rules.
 * These rely on recRuleAltPredicate(),
 * recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
 * templates in main language.stg
 */
group LeftRecursiveRules;

recRule(ruleName, argName, primaryAlts, opAlts, setResultAction,
        userRetvals, leftRecursiveRuleRefLabels) ::=
<<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
  : ({} <primaryAlts:{alt | <alt.altText> }; separator="\n | ">
)
    (
      <opAlts; separator="\n | ">
)*
  ;
>>

recRuleAlt(alt, precOption, opPrec, pred) ::= <<
{<pred>}?\<<precOption>=<opPrec>\> <alt.altText>
>>

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-

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*/
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This file contains the actual layout of the messages emitted by ANTLR.

This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"

wantsSingleLineMessage() ::= "false"

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-
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 */
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The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

location(file, line, column) ::= "<file>:<line>:"

message(id, text) ::= "<text> (<id>)"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

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 */

tree grammar SourceGenTriggers;
options {
 language    = Java;
 tokenVocab  = ANTLRParser;
 ASTLabelType = GrammarAST;
}

@header {
package org.antlr.v4.codegen;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.codegen.model.*;
import org.antlr.v4.codegen.model.decl.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.Collections;
import java.util.Map;
import java.util.HashMap;
}

@members {
 public OutputModelController controller;
  public boolean hasLookaheadBlock;
  public SourceGenTriggers(TreeNodeStream input, OutputModelController controller) {
   this(input);
   this.controller = controller;
  }
}

dummy : block[null, null] ;

block[GrammarAST label, GrammarAST ebnfRoot] returns [List<? extends SrcOp> omos]
  : ^( blk=BLOCK (^(OPTIONS .+))?
  {List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();}
   ( alternative {alts.add($alternative.altCodeBlock);} )+
  )
  {
  if ( alts.size()==1 && ebnfRoot==null) return alts;
  if ( ebnfRoot==null ) {
     $omos = DefaultOutputModelFactory.list(controller.getChoiceBlock((BlockAST)$blk, alts, $label));
  }
  else {
      Choice choice = controller.getEBNFBlock($ebnfRoot, alts);
      hasLookaheadBlock |= choice instanceof PlusBlock || choice instanceof StarBlock;
     $omos = DefaultOutputModelFactory.list(choice);
```

```
      }
      }
     ;

   alternative returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
   @init {
     boolean outerMost = inContext("RULE BLOCK");
   }
   @after {
     controller.finishAlternative($altCodeBlock, $ops, outerMost);
   }
     : a=alt[outerMost] {$altCodeBlock=$a.altCodeBlock; $ops=$a.ops;}
    ;

   alt[boolean outerMost] returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
   @init {
   // set alt if outer ALT only (the only ones with alt field set to Alternative object)
    AltAST altAST = (AltAST)retval.start;
    if ( outerMost ) controller.setCurrentOuterMostAlt(altAST.alt);
   }
    : {
    List<SrcOp> elems = new ArrayList<SrcOp>();
    // TODO: shouldn't we pass $start to controller.alternative()?
    $altCodeBlock = controller.alternative(controller.getCurrentOuterMostAlt(), outerMost);
    $altCodeBlock.ops = $ops = elems;
    controller.setCurrentBlock($altCodeBlock);
    }
    ^( ALT elementOptions? ( element {if ($element.omos!=null) elems.addAll($element.omos);} )+ )

    | ^(ALT elementOptions? EPSILON)
       {$altCodeBlock = controller.epsilon(controller.getCurrentOuterMostAlt(), outerMost);}
    ;

   element returns [List<? extends SrcOp> omos]
    : labeledElement     {$omos = $labeledElement.omos;}
    | atom[null,false]   {$omos = $atom.omos;}
    | subrule            {$omos = $subrule.omos;}
    |  ACTION       {$omos = controller.action((ActionAST)$ACTION);}
    |  SEMPRED       {$omos = controller.sempred((ActionAST)$SEMPRED);}
    | ^(ACTION elementOptions)  {$omos = controller.action((ActionAST)$ACTION);}
    |  ^(SEMPRED elementOptions)  {$omos = controller.sempred((ActionAST)$SEMPRED);}
    ;

   labeledElement returns [List<? extends SrcOp> omos]
    : ^(ASSIGN ID atom[$ID,false] )   {$omos = $atom.omos;}
    | ^(PLUS_ASSIGN ID atom[$ID,false]) {$omos = $atom.omos;}
    | ^(ASSIGN ID block[$ID,null] )   {$omos = $block.omos;}
    | ^(PLUS_ASSIGN ID block[$ID,null]) {$omos = $block.omos;}
```

```
    ;

subrule returns [List<? extends SrcOp> omos]
 : ^(OPTIONAL b=block[null,$OPTIONAL])
  {
  $omos = $block.omos;
  }
 | ( ^(op=CLOSURE b=block[null,null])
  | ^(op=POSITIVE_CLOSURE b=block[null,null])
  )
  {
  List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();
  SrcOp blk = $b.omos.get(0);
  CodeBlockForAlt alt = new CodeBlockForAlt(controller.delegate);
  alt.addOp(blk);
  alts.add(alt);
  SrcOp loop = controller.getEBNFBlock($op, alts); // "star it"
     hasLookaheadBlock |= loop instanceof PlusBlock || loop instanceof StarBlock;
     $omos = DefaultOutputModelFactory.list(loop);
  }
 | block[null, null]     {$omos = $block.omos;}
  ;


blockSet[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
  : ^(SET atom[label,invert]+) {$omos = controller.set($SET, $label, invert);}
  ;


/*
setElement
 : STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE STRING_LITERAL STRING_LITERAL)
 ;
*/

// TODO: combine ROOT/BANG into one then just make new op ref'ing return value of atom/terminal...
// TODO: same for NOT
atom[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
 : ^(NOT a=atom[$label, true])  {$omos = $a.omos;}
 | range[label]       {$omos = $range.omos;}
 | ^(DOT ID terminal[$label])
 | ^(DOT ID ruleref[$label])
  | ^(WILDCARD .)      {$omos = controller.wildcard($WILDCARD, $label);}
  | WILDCARD        {$omos = controller.wildcard($WILDCARD, $label);}
  |  terminal[label]    {$omos = $terminal.omos;}
  |  ruleref[label]     {$omos = $ruleref.omos;}
 | blockSet[$label, invert]  {$omos = $blockSet.omos;}
 ;
```

```
ruleref[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RULE_REF ARG_ACTION? elementOptions?) {$omos = controller.ruleRef($RULE_REF, $label,
$ARG_ACTION);}
  ;

range[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  ;

terminal[GrammarAST label] returns [List<SrcOp> omos]
  : ^(STRING_LITERAL .)   {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | STRING_LITERAL   {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | ^(TOKEN_REF ARG_ACTION .) {$omos = controller.tokenRef($TOKEN_REF, $label, $ARG_ACTION);}
  | ^(TOKEN_REF .)   {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  | TOKEN_REF   {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  ;

elementOptions
  : ^(ELEMENT_OPTIONS elementOption+)
  ;

elementOption
  : ID
  | ^(ASSIGN ID ID)
  | ^(ASSIGN ID STRING_LITERAL)
  | ^(ASSIGN ID ACTION)
  | ^(ASSIGN ID INT)
  ;
```

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* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/SetAttr.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_text.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-

jar/org/antlr/v4/codegen/model/MatchToken.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/AltLabelStructDecl.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/target/CSharpTarget.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Sync.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_int.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/automata/ATNVisitor.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/StarBlock.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/SemPred.java

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* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/GrammarASTWithOptions.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/automata/ParserATNFactory.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/LabelElementPair.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/target/JavaTarget.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1Choice.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1Loop.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1AltBlock.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/AttributeDict.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/Tool.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/misc/Utils.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/GrammarSyntaxMessage.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/ThrowRecognitionException.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/LexerGrammar.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/ExceptionClause.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/automata/ATNFactory.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/BaseListenerFile.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/ThrowEarlyExitException.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/BlockAST.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/Grammar.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_parser.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/GrammarInterpreterRuleContext.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/RuleContextDecl.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_start.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/gui/TreeTextProvider.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextTokenListGetterDecl.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextTokenGetterDecl.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1OptionalBlock.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/TokenListDecl.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/ActionAST.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ArgRef.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Loop.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextGetterDecl.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ErrorManager.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/RuleAST.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/CodeBlockForAlt.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/RuleFunction.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Lexer.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/PlusBlockAST.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/AttributeResolver.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/RuleElementAST.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/DefaultOutputModelFactory.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/gui/TestRig.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/target/SwiftTarget.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/SetNonLocalAttr.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/NonLocalAttrRef.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/Attribute.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ListLabelRef.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_text.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/PlusBlock.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/StructDecl.java

* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/ast/PredAST.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/LexerFactory.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/OutputModelObject.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/LeftRecursiveRule.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/GrammarSemanticsMessage.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_stop.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LL1OptionalBlockSingleAlt.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/decl/ContextRuleListGetterDecl.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/automata/ATNOptimizer.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/chunk/ActionChunk.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/Parser.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/semantics/ActionSniffer.java
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/codegen/model/LeftRecursiveRuleFunction.java
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*/

/** templates used to generate make-compatible dependencies */

/** Generate "f : x, y, z" dependencies for input
* dependencies and generated files. in and out
* are File objects. For example, you can say
* <f.canonicalPath>
*/
dependencies(grammarFileName,in,out) ::= <<
<if(in)><grammarFileName>: <in; separator=", "><endif>
<out:{f | <f> : <grammarFileName>}; separator="\n">
>>

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/tool/templates/depend.stg
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```
*/

/** The definitive ANTLR v3 tree grammar to walk/visit ANTLR v4 grammars.
 *  Parses trees created by ANTLRParser.g.
 *
 *  Rather than have multiple tree grammars, one for each visit, I'm
 *  creating this generic visitor that knows about context. All of the
 *  boilerplate pattern recognition is done here. Then, subclasses can
 *  override the methods they care about. This prevents a lot of the same
 *  context tracking stuff like "set current alternative for current
 *  rule node" that is repeated in lots of tree filters.
 */
tree grammar GrammarTreeVisitor;
options {
 language     = Java;
 tokenVocab    = ANTLRParser;
 ASTLabelType  = GrammarAST;
}

// Include the copyright in this source and also the generated source
@header {
/*
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```

```
*/
package org.antlr.v4.parse;
import org.antlr.v4.Tool;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.lang.reflect.InvocationTargetException;
import java.lang.reflect.Method;
}

@members {
public String grammarName;
public GrammarAST currentRuleAST;
public String currentModeName = LexerGrammar.DEFAULT_MODE_NAME;
public String currentRuleName;
public GrammarAST currentOuterAltRoot;
public int currentOuterAltNumber = 1; // 1..n
public int rewriteEBNFLevel = 0;

public GrammarTreeVisitor() { this(null); }

// Should be abstract but can't make gen'd parser abstract;
// subclasses should implement else everything goes to stderr!
public ErrorManager getErrorManager() { return null; }

public void visitGrammar(GrammarAST t) { visit(t, "grammarSpec"); }
public void visit(GrammarAST t, String ruleName) {
 CommonTreeNodeStream nodes = new CommonTreeNodeStream(new GrammarASTAdaptor(), t);
 setTreeNodeStream(nodes);
 try {
  Method m = getClass().getMethod(ruleName);
  m.invoke(this);
 }
 catch (Throwable e) {
  ErrorManager errMgr = getErrorManager();
  if ( e instanceof InvocationTargetException ) {
   e = e.getCause();
  }
  //e.printStackTrace(System.err);
  if ( errMgr==null ) {
   System.err.println("can't find rule "+ruleName+
       " or tree structure error: "+t.toStringTree()
       );
   e.printStackTrace(System.err);
  }
  else errMgr.toolError(ErrorType.INTERNAL_ERROR, e);
 }
}
```

```java
public void discoverGrammar(GrammarRootAST root, GrammarAST ID) { }
public void finishPrequels(GrammarAST firstPrequel) { }
public void finishGrammar(GrammarRootAST root, GrammarAST ID) { }

public void grammarOption(GrammarAST ID, GrammarAST valueAST) { }
public void ruleOption(GrammarAST ID, GrammarAST valueAST) { }
public void blockOption(GrammarAST ID, GrammarAST valueAST) { }
public void defineToken(GrammarAST ID) { }
public void defineChannel(GrammarAST ID) { }
public void globalNamedAction(GrammarAST scope, GrammarAST ID, ActionAST action) { }
public void importGrammar(GrammarAST label, GrammarAST ID) { }

public void modeDef(GrammarAST m, GrammarAST ID) { }

public void discoverRules(GrammarAST rules) { }
public void finishRules(GrammarAST rule) { }
public void discoverRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
    ActionAST arg, ActionAST returns, GrammarAST thrws,
    GrammarAST options, ActionAST locals,
    List<GrammarAST> actions,
    GrammarAST block) { }
public void finishRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void discoverLexerRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
                GrammarAST block) { }
public void finishLexerRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void ruleCatch(GrammarAST arg, ActionAST action) { }
public void finallyAction(ActionAST action) { }
public void discoverOuterAlt(AltAST alt) { }
public void finishOuterAlt(AltAST alt) { }
public void discoverAlt(AltAST alt) { }
public void finishAlt(AltAST alt) { }

public void ruleRef(GrammarAST ref, ActionAST arg) { }
public void tokenRef(TerminalAST ref) { }
public void elementOption(GrammarASTWithOptions t, GrammarAST ID, GrammarAST valueAST) { }
public void stringRef(TerminalAST ref) { }
public void wildcardRef(GrammarAST ref) { }
public void actionInAlt(ActionAST action) { }
public void sempredInAlt(PredAST pred) { }
public void label(GrammarAST op, GrammarAST ID, GrammarAST element) { }
public void lexerCallCommand(int outerAltNumber, GrammarAST ID, GrammarAST arg) { }
public void lexerCommand(int outerAltNumber, GrammarAST ID) { }

protected void enterGrammarSpec(GrammarAST tree) { }
protected void exitGrammarSpec(GrammarAST tree) { }

protected void enterPrequelConstructs(GrammarAST tree) { }
protected void exitPrequelConstructs(GrammarAST tree) { }
```

```java
    protected void enterPrequelConstruct(GrammarAST tree) { }
    protected void exitPrequelConstruct(GrammarAST tree) { }

    protected void enterOptionsSpec(GrammarAST tree) { }
    protected void exitOptionsSpec(GrammarAST tree) { }

    protected void enterOption(GrammarAST tree) { }
    protected void exitOption(GrammarAST tree) { }

    protected void enterOptionValue(GrammarAST tree) { }
    protected void exitOptionValue(GrammarAST tree) { }

    protected void enterDelegateGrammars(GrammarAST tree) { }
    protected void exitDelegateGrammars(GrammarAST tree) { }

    protected void enterDelegateGrammar(GrammarAST tree) { }
    protected void exitDelegateGrammar(GrammarAST tree) { }

    protected void enterTokensSpec(GrammarAST tree) { }
    protected void exitTokensSpec(GrammarAST tree) { }

    protected void enterTokenSpec(GrammarAST tree) { }
    protected void exitTokenSpec(GrammarAST tree) { }

    protected void enterChannelsSpec(GrammarAST tree) { }
    protected void exitChannelsSpec(GrammarAST tree) { }

    protected void enterChannelSpec(GrammarAST tree) { }
    protected void exitChannelSpec(GrammarAST tree) { }

    protected void enterAction(GrammarAST tree) { }
    protected void exitAction(GrammarAST tree) { }

    protected void enterRules(GrammarAST tree) { }
    protected void exitRules(GrammarAST tree) { }

    protected void enterMode(GrammarAST tree) { }
    protected void exitMode(GrammarAST tree) { }

    protected void enterLexerRule(GrammarAST tree) { }
    protected void exitLexerRule(GrammarAST tree) { }

    protected void enterRule(GrammarAST tree) { }
    protected void exitRule(GrammarAST tree) { }

    protected void enterExceptionGroup(GrammarAST tree) { }
    protected void exitExceptionGroup(GrammarAST tree) { }
```

```java
protected void enterExceptionHandler(GrammarAST tree) { }
protected void exitExceptionHandler(GrammarAST tree) { }

protected void enterFinallyClause(GrammarAST tree) { }
protected void exitFinallyClause(GrammarAST tree) { }

protected void enterLocals(GrammarAST tree) { }
protected void exitLocals(GrammarAST tree) { }

protected void enterRuleReturns(GrammarAST tree) { }
protected void exitRuleReturns(GrammarAST tree) { }

protected void enterThrowsSpec(GrammarAST tree) { }
protected void exitThrowsSpec(GrammarAST tree) { }

protected void enterRuleAction(GrammarAST tree) { }
protected void exitRuleAction(GrammarAST tree) { }

protected void enterRuleModifier(GrammarAST tree) { }
protected void exitRuleModifier(GrammarAST tree) { }

protected void enterLexerRuleBlock(GrammarAST tree) { }
protected void exitLexerRuleBlock(GrammarAST tree) { }

protected void enterRuleBlock(GrammarAST tree) { }
protected void exitRuleBlock(GrammarAST tree) { }

protected void enterLexerOuterAlternative(AltAST tree) { }
protected void exitLexerOuterAlternative(AltAST tree) { }

protected void enterOuterAlternative(AltAST tree) { }
protected void exitOuterAlternative(AltAST tree) { }

protected void enterLexerAlternative(GrammarAST tree) { }
protected void exitLexerAlternative(GrammarAST tree) { }

protected void enterLexerElements(GrammarAST tree) { }
protected void exitLexerElements(GrammarAST tree) { }

protected void enterLexerElement(GrammarAST tree) { }
protected void exitLexerElement(GrammarAST tree) { }

protected void enterLabeledLexerElement(GrammarAST tree) { }
protected void exitLabeledLexerElement(GrammarAST tree) { }

protected void enterLexerBlock(GrammarAST tree) { }
protected void exitLexerBlock(GrammarAST tree) { }
```

```java
protected void enterLexerAtom(GrammarAST tree) { }
protected void exitLexerAtom(GrammarAST tree) { }

protected void enterActionElement(GrammarAST tree) { }
protected void exitActionElement(GrammarAST tree) { }

protected void enterAlternative(AltAST tree) { }
protected void exitAlternative(AltAST tree) { }

protected void enterLexerCommand(GrammarAST tree) { }
protected void exitLexerCommand(GrammarAST tree) { }

protected void enterLexerCommandExpr(GrammarAST tree) { }
protected void exitLexerCommandExpr(GrammarAST tree) { }

protected void enterElement(GrammarAST tree) { }
protected void exitElement(GrammarAST tree) { }

protected void enterAstOperand(GrammarAST tree) { }
protected void exitAstOperand(GrammarAST tree) { }

protected void enterLabeledElement(GrammarAST tree) { }
protected void exitLabeledElement(GrammarAST tree) { }

protected void enterSubrule(GrammarAST tree) { }
protected void exitSubrule(GrammarAST tree) { }

protected void enterLexerSubrule(GrammarAST tree) { }
protected void exitLexerSubrule(GrammarAST tree) { }

protected void enterBlockSuffix(GrammarAST tree) { }
protected void exitBlockSuffix(GrammarAST tree) { }

protected void enterEbnfSuffix(GrammarAST tree) { }
protected void exitEbnfSuffix(GrammarAST tree) { }

protected void enterAtom(GrammarAST tree) { }
protected void exitAtom(GrammarAST tree) { }

protected void enterBlockSet(GrammarAST tree) { }
protected void exitBlockSet(GrammarAST tree) { }

protected void enterSetElement(GrammarAST tree) { }
protected void exitSetElement(GrammarAST tree) { }

protected void enterBlock(GrammarAST tree) { }
protected void exitBlock(GrammarAST tree) { }
```

```
protected void enterRuleref(GrammarAST tree) { }
protected void exitRuleref(GrammarAST tree) { }

protected void enterRange(GrammarAST tree) { }
protected void exitRange(GrammarAST tree) { }

protected void enterTerminal(GrammarAST tree) { }
protected void exitTerminal(GrammarAST tree) { }

protected void enterElementOptions(GrammarAST tree) { }
protected void exitElementOptions(GrammarAST tree) { }

protected void enterElementOption(GrammarAST tree) { }
protected void exitElementOption(GrammarAST tree) { }

 @Override
 public void traceIn(String ruleName, int ruleIndex)  {
  System.err.println("enter "+ruleName+": "+input.LT(1));
 }

 @Override
 public void traceOut(String ruleName, int ruleIndex)  {
  System.err.println("exit "+ruleName+": "+input.LT(1));
 }
}

grammarSpec
@init {
 enterGrammarSpec($start);
}
@after {
 exitGrammarSpec($start);
}
  :  ^( GRAMMAR ID {grammarName=$ID.text;}
     {discoverGrammar((GrammarRootAST)$GRAMMAR, $ID);}
      prequelConstructs
     {finishPrequels($prequelConstructs.firstOne);}
      rules mode*
     {finishGrammar((GrammarRootAST)$GRAMMAR, $ID);}
   )
 ;

prequelConstructs returns [GrammarAST firstOne=null]
@init {
 enterPrequelConstructs($start);
}
@after {
```

```
   exitPrequelConstructs($start);
   }
   : {$firstOne=$start;} prequelConstruct+
   |
   ;

prequelConstruct
@init {
 enterPrequelConstructs($start);
}
@after {
 exitPrequelConstructs($start);
}
 :  optionsSpec
   | delegateGrammars
   | tokensSpec
   | channelsSpec
   | action
   ;

optionsSpec
@init {
 enterOptionsSpec($start);
}
@after {
 exitOptionsSpec($start);
}
 : ^(OPTIONS option*)
   ;

option
@init {
 enterOption($start);
 boolean rule = inContext("RULE ...");
 boolean block = inContext("BLOCK ...");
}
@after {
 exitOption($start);
}
   :  ^(a=ASSIGN ID v=optionValue)
    {
    if ( block ) blockOption($ID, $v.start); // most specific first
    else if ( rule ) ruleOption($ID, $v.start);
    else grammarOption($ID, $v.start);
    }
   ;

optionValue returns [String v]
```

```
@init {
enterOptionValue($start);
$v = $start.token.getText();
}
@after {
exitOptionValue($start);
}
  :  ID
  |  STRING_LITERAL
  |  INT
  ;

delegateGrammars
@init {
enterDelegateGrammars($start);
}
@after {
exitDelegateGrammars($start);
}
  :  ^(IMPORT delegateGrammar+)
  ;

delegateGrammar
@init {
enterDelegateGrammar($start);
}
@after {
exitDelegateGrammar($start);
}
  :  ^(ASSIGN label=ID id=ID) {importGrammar($label, $id);}
  |  id=ID     {importGrammar(null, $id);}
  ;

tokensSpec
@init {
enterTokensSpec($start);
}
@after {
exitTokensSpec($start);
}
  :  ^(TOKENS_SPEC tokenSpec+)
  ;

tokenSpec
@init {
enterTokenSpec($start);
}
@after {
```

```
exitTokenSpec($start);
}
: ID    {defineToken($ID);}
;


channelsSpec
@init {
enterChannelsSpec($start);
}
@after {
exitChannelsSpec($start);
}
:  ^(CHANNELS channelSpec+)
;


channelSpec
@init {
enterChannelSpec($start);
}
@after {
exitChannelSpec($start);
}
: ID     {defineChannel($ID);}
;


action
@init {
enterAction($start);
}
@after {
exitAction($start);
}
: ^(AT sc=ID? name=ID ACTION) {globalNamedAction($sc, $name, (ActionAST)$ACTION);}
;


rules
@init {
enterRules($start);
}
@after {
exitRules($start);
}
  : ^(RULES {discoverRules($RULES);} (rule|lexerRule)* {finishRules($RULES);})
  ;


mode
@init {
enterMode($start);
```

```
}
@after {
exitMode($start);
}
	: ^( MODE ID {currentModeName=$ID.text; modeDef($MODE, $ID);} lexerRule* )
	;


lexerRule
@init {
enterLexerRule($start);
List<GrammarAST> mods = new ArrayList<GrammarAST>();
currentOuterAltNumber=0;
}
@after {
exitLexerRule($start);
}
	: ^( RULE TOKEN_REF
	  {currentRuleName=$TOKEN_REF.text; currentRuleAST=$RULE;}
	  (^(RULEMODIFIERS m=FRAGMENT {mods.add($m);}))?
	    {discoverLexerRule((RuleAST)$RULE, $TOKEN_REF, mods, (GrammarAST)input.LT(1));}
	    lexerRuleBlock
	    {
	    finishLexerRule((RuleAST)$RULE, $TOKEN_REF, $lexerRuleBlock.start);
	    currentRuleName=null; currentRuleAST=null;
	    }
	    )
	;


rule
@init {
enterRule($start);
List<GrammarAST> mods = new ArrayList<GrammarAST>();
List<GrammarAST> actions = new ArrayList<GrammarAST>(); // track roots
currentOuterAltNumber=0;
}
@after {
exitRule($start);
}
	:  ^( RULE RULE_REF {currentRuleName=$RULE_REF.text; currentRuleAST=$RULE;}
	  (^(RULEMODIFIERS (m=ruleModifier{mods.add($m.start);})+))?
	  ARG_ACTION?
	    ret=ruleReturns?
	    thr=throwsSpec?
	    loc=locals?
	    ( opts=optionsSpec
	    | a=ruleAction {actions.add($a.start);}
	    )*
	    {discoverRule((RuleAST)$RULE, $RULE_REF, mods, (ActionAST)$ARG_ACTION,
```

```
            $ret.start!=null?(ActionAST)$ret.start.getChild(0):null,
            $thr.start, $opts.start,
            $loc.start!=null?(ActionAST)$loc.start.getChild(0):null,
            actions, (GrammarAST)input.LT(1));}
        ruleBlock exceptionGroup
        {finishRule((RuleAST)$RULE, $RULE_REF, $ruleBlock.start); currentRuleName=null; currentRuleAST=null;}
        )
    ;


exceptionGroup
@init {
 enterExceptionGroup($start);
}
@after {
 exitExceptionGroup($start);
}
  : exceptionHandler* finallyClause?
  ;


exceptionHandler
@init {
 enterExceptionHandler($start);
}
@after {
 exitExceptionHandler($start);
}
 : ^(CATCH ARG_ACTION ACTION) {ruleCatch($ARG_ACTION, (ActionAST)$ACTION);}
 ;


finallyClause
@init {
 enterFinallyClause($start);
}
@after {
 exitFinallyClause($start);
}
 : ^(FINALLY ACTION)    {finallyAction((ActionAST)$ACTION);}
 ;


locals
@init {
 enterLocals($start);
}
@after {
 exitLocals($start);
}
 : ^(LOCALS ARG_ACTION)
 ;
```

```
ruleReturns
@init {
enterRuleReturns($start);
}
@after {
exitRuleReturns($start);
}
 : ^(RETURNS ARG_ACTION)
 ;

throwsSpec
@init {
enterThrowsSpec($start);
}
@after {
exitThrowsSpec($start);
}
  : ^(THROWS ID+)
  ;

ruleAction
@init {
enterRuleAction($start);
}
@after {
exitRuleAction($start);
}
 : ^(AT ID ACTION)
 ;

ruleModifier
@init {
enterRuleModifier($start);
}
@after {
exitRuleModifier($start);
}
  : PUBLIC
  | PRIVATE
  | PROTECTED
  | FRAGMENT
  ;

lexerRuleBlock
@init {
enterLexerRuleBlock($start);
}
```

```
@after {
exitLexerRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    lexerOuterAlternative
   )+
   )
  ;

ruleBlock
@init {
enterRuleBlock($start);
}
@after {
exitRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    outerAlternative
   )+
   )
  ;

lexerOuterAlternative
@init {
enterLexerOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
@after {
finishOuterAlt((AltAST)$start);
exitLexerOuterAlternative((AltAST)$start);
}
: lexerAlternative
;


outerAlternative
@init {
enterOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
```

```
@after {
finishOuterAlt((AltAST)$start);
exitOuterAlternative((AltAST)$start);
}
: alternative
;

lexerAlternative
@init {
enterLexerAlternative($start);
}
@after {
exitLexerAlternative($start);
}
: ^(LEXER_ALT_ACTION lexerElements lexerCommand+)
  | lexerElements
  ;

lexerElements
@init {
enterLexerElements($start);
}
@after {
exitLexerElements($start);
}
  : ^(ALT lexerElement+)
  ;

lexerElement
@init {
enterLexerElement($start);
}
@after {
exitLexerElement($start);
}
: labeledLexerElement
| lexerAtom
| lexerSubrule
|   ACTION     {actionInAlt((ActionAST)$ACTION);}
|   SEMPRED     {sempredInAlt((PredAST)$SEMPRED);}
|   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
| EPSILON
;

labeledLexerElement
@init {
enterLabeledLexerElement($start);
```

```
}
@after {
 exitLabeledLexerElement($start);
}
   :   ^((ASSIGN|PLUS_ASSIGN) ID (lexerAtom|block))
 ;

lexerBlock
@init {
 enterLexerBlock($start);
}
@after {
 exitLexerBlock($start);
}
 : ^(BLOCK optionsSpec? lexerAlternative+)
   ;

lexerAtom
@init {
 enterLexerAtom($start);
}
@after {
 exitLexerAtom($start);
}
   :   terminal
   |   ^(NOT blockSet)
   |   blockSet
   |   ^(WILDCARD elementOptions)
   |   WILDCARD
   | LEXER_CHAR_SET
   |   range
   |   ruleref
   ;

actionElement
@init {
 enterActionElement($start);
}
@after {
 exitActionElement($start);
}
 : ACTION
 |   ^(ACTION elementOptions)
 |   SEMPRED
 |   ^(SEMPRED elementOptions)
 ;

alternative
```

```
@init {
enterAlternative((AltAST)$start);
discoverAlt((AltAST)$start);
}
@after {
finishAlt((AltAST)$start);
exitAlternative((AltAST)$start);
}
 : ^(ALT elementOptions? element+)
 | ^(ALT elementOptions? EPSILON)
   ;

lexerCommand
@init {
enterLexerCommand($start);
}
@after {
exitLexerCommand($start);
}
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
     {lexerCallCommand(currentOuterAltNumber, $ID, $lexerCommandExpr.start);}
 | ID
     {lexerCommand(currentOuterAltNumber, $ID);}
 ;

lexerCommandExpr
@init {
enterLexerCommandExpr($start);
}
@after {
exitLexerCommandExpr($start);
}
 : ID
 | INT
 ;

element
@init {
enterElement($start);
}
@after {
exitElement($start);
}
 : labeledElement
 | atom
 | subrule
 | ACTION     {actionInAlt((ActionAST)$ACTION);}
 | SEMPRED    {sempredInAlt((PredAST)$SEMPRED);}
```

```
|   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}

| ^(NOT blockSet)
| ^(NOT block)
;

astOperand
@init {
 enterAstOperand($start);
}
@after {
 exitAstOperand($start);
}
 : atom
| ^(NOT blockSet)
| ^(NOT block)
 ;

labeledElement
@init {
 enterLabeledElement($start);
}
@after {
 exitLabeledElement($start);
}
 : ^((ASSIGN|PLUS_ASSIGN) ID element) {label($start, $ID, $element.start);}
 ;

subrule
@init {
 enterSubrule($start);
}
@after {
 exitSubrule($start);
}
 : ^(blockSuffix block)
| block
  ;

lexerSubrule
@init {
 enterLexerSubrule($start);
}
@after {
 exitLexerSubrule($start);
}
 : ^(blockSuffix lexerBlock)
```

```
    | lexerBlock
    ;

blockSuffix
@init {
enterBlockSuffix($start);
}
@after {
exitBlockSuffix($start);
}
  : ebnfSuffix
  ;

ebnfSuffix
@init {
enterEbnfSuffix($start);
}
@after {
exitEbnfSuffix($start);
}
 : OPTIONAL
  | CLOSURE
   | POSITIVE_CLOSURE
 ;

atom
@init {
enterAtom($start);
}
@after {
exitAtom($start);
}
 : ^(DOT ID terminal)
 | ^(DOT ID ruleref)
  | ^(WILDCARD elementOptions) {wildcardRef($WILDCARD);}
  | WILDCARD     {wildcardRef($WILDCARD);}
  |  terminal
  | blockSet
  |  ruleref
  ;

blockSet
@init {
enterBlockSet($start);
}
@after {
exitBlockSet($start);
}
```

```
: ^(SET setElement+)
;

setElement
@init {
enterSetElement($start);
}
@after {
exitSetElement($start);
}
: ^(STRING_LITERAL elementOptions)    {stringRef((TerminalAST)$STRING_LITERAL);}
| ^(TOKEN_REF elementOptions)   {tokenRef((TerminalAST)$TOKEN_REF);}
| STRING_LITERAL              {stringRef((TerminalAST)$STRING_LITERAL);}
| TOKEN_REF              {tokenRef((TerminalAST)$TOKEN_REF);}
| ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
 {
 stringRef((TerminalAST)$a);
 stringRef((TerminalAST)$b);
 }
    |    LEXER_CHAR_SET
;

block
@init {
enterBlock($start);
}
@after {
exitBlock($start);
}
 : ^(BLOCK optionsSpec? ruleAction* ACTION? alternative+)
 ;

ruleref
@init {
enterRuleref($start);
}
@after {
exitRuleref($start);
}
 : ^(RULE_REF arg=ARG_ACTION? elementOptions?)
  {
  ruleRef($RULE_REF, (ActionAST)$ARG_ACTION);
  if ( $arg!=null ) actionInAlt((ActionAST)$arg);
  }
 ;

range
@init {
```

```
  enterRange($start);
}
@after {
 exitRange($start);
}
  : ^(RANGE STRING_LITERAL STRING_LITERAL)
  ;


terminal
@init {
 enterTerminal($start);
}
@after {
 exitTerminal($start);
}
  : ^(STRING_LITERAL elementOptions)
        {stringRef((TerminalAST)$STRING_LITERAL);}
  | STRING_LITERAL    {stringRef((TerminalAST)$STRING_LITERAL);}
  | ^(TOKEN_REF elementOptions) {tokenRef((TerminalAST)$TOKEN_REF);}
  | TOKEN_REF       {tokenRef((TerminalAST)$TOKEN_REF);}
  ;

elementOptions
@init {
 enterElementOptions($start);
}
@after {
 exitElementOptions($start);
}
  : ^(ELEMENT_OPTIONS elementOption[(GrammarASTWithOptions)$start.getParent()]*)
  ;

elementOption[GrammarASTWithOptions t]
@init {
 enterElementOption($start);
}
@after {
 exitElementOption($start);
}
  : ID       {elementOption(t, $ID, null);}
  | ^(ASSIGN id=ID v=ID)   {elementOption(t, $id, $v);}
  | ^(ASSIGN ID v=STRING_LITERAL) {elementOption(t, $ID, $v);}
  | ^(ASSIGN ID v=ACTION)   {elementOption(t, $ID, $v);}
  | ^(ASSIGN ID v=INT)    {elementOption(t, $ID, $v);}
  ;
```

Found in path(s):
* /opt/cola/permits/1237463103_1638811348.19/0/antlr4-4-6-sources-jar/org/antlr/v4/parse/GrammarTreeVisitor.g

1.247 jinjava 2.1.16

1.247.1 Available under license :

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Found in path(s):
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-
jar/com/hubspot/jinjava/lib/filter/BoolFilter.java
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* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-
jar/com/hubspot/jinjava/lib/filter/EscapeJsFilter.java
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Found in path(s):

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/IfTag.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/interpret/Context.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/IncludeTag.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/RootNode.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/TreeParser.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/ExpressionNode.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/HelperStringTokenizer.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/Variable.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/interpret/JinjavaInterpreter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/CutFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/FilterLibrary.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/JinjavaConfig.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/ObjectIterator.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/TextNode.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/IfchangedTag.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/Tag.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/ForTag.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/SetTag.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/AbsFilter.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/BlockTag.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/ExtendsTag.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/TagNode.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/CycleTag.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/Node.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/TokenScanner.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/EscapeFilter.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/Jinjava.java
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Found in path(s):
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/Md5Filter.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/DefaultFilter.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/UpperFilter.java
* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-

jar/com/hubspot/jinjava/loader/FileLocator.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/ForLoop.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/TruncateFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/DivisibleFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/DivideFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/Logging.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/TextToken.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/Filter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/DatetimeFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/MultiplyFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/NoteToken.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/util/ObjectTruthValue.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/loader/ResourceLocator.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/ElseTag.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/LengthFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/SimpleLibrary.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/TokenScannerSymbols.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/ExpressionToken.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/ReverseFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/filter/RandomFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/Importable.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/lib/tag/TagLibrary.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/tree/parse/Token.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-jar/com/hubspot/jinjava/interpret/InterpretException.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-

jar/com/hubspot/jinjava/tree/parse/TagToken.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-

jar/com/hubspot/jinjava/lib/filter/LowerFilter.java

* /opt/cola/permits/1354022443_1656537183.4337616/0/jinjava-2-1-16-sources-

jar/com/hubspot/jinjava/lib/filter/AddFilter.java

1.248 hamcrest 1.3

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1.249 geb-junit4 0.9.2

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* /opt/cola/permits/1354023151_1656537268.5334358/0/geb-junit4-0-9-2-sources-jar/geb/junit4/GebTest.groovy
* /opt/cola/permits/1354023151_1656537268.5334358/0/geb-junit4-0-9-2-sources-jar/geb/junit4/GebReportingTest.groovy

1.250 apache-common-codec 1.14

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1.252 metrics-utility-servlets 4.0.5

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Manifest-Version: 1.0

Bnd-LastModified: 1545938238563

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: A set of utility servlets for Metrics, allowing yo

u to expose valuable information about   your production environ

ment.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Utility Servlets

Bundle-SymbolicName: io.dropwizard.metrics.servlets

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.servlets;uses:="com.codahale.metr

ics,com.codahale.metrics.health,javax.servlet,javax.servlet.http";ver

sion="4.0.5"

Implementation-Title: Metrics Utility Servlets

Implementation-URL: http://metrics.dropwizard.io/metrics-servlets

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: javax.servlet;version="[2.5.0,4.0.0)",javax.servlet.ht

tp;version="[2.5.0,4.0.0)",com.codahale.metrics;version="[4.0,5)",com

.codahale.metrics.health;version="[4.0,5)",com.codahale.metrics.json;

version="[4.0,5)",com.codahale.metrics.jvm;version="[4.0,5)",com.fast

erxml.jackson.databind;version="[2.9,3)",com.fasterxml.jackson.databi

nd.util;version="[2.9,3)",com.papertrail.profiler,org.joda.time;versi

on="[2.9,3)"

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

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* /opt/cola/permits/1274701310_1648835822.95/0/metrics-servlets-4-0-5-jar/META-INF/MANIFEST.MF

1.253 scala-xml 1.0.6

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1.255 archunit 0.22.0

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Manifest-Version: 1.0

Built-By: Gradle 6.8.3

Built-Date: 2021-10-29

Specification-Title: ArchUnit - Module 'archunit'

Specification-Version: 0.22.0

Specification-Vendor: TNG Technology Consulting GmbH

Implementation-Title: com.tngtech.archunit

Implementation-Version: 0.22.0

Implementation-Vendor: TNG Technology Consulting GmbH

Issue-Tracker: https://github.com/TNG/ArchUnit/issues

Documentation-URL: https://github.com/TNG/ArchUnit

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Automatic-Module-Name: com.tngtech.archunit

Found in path(s):

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Found in path(s):

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* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/core/importer/JavaClassProcessor.java

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jar/com/tngtech/archunit/base/ArchUnitException.java

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jar/com/tngtech/archunit/lang/syntax/FieldsThatInternal.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/syntax/MembersThatInternal.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
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* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
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* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
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* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/core/domain/ThrowsDeclaration.java
* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/ConditionEvent.java
* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-

jar/com/tngtech/archunit/library/dependencies/Cycle.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/conditions/AllAttributesMatchCondition.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/SimpleConditionEvent.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/core/importer/ClassFileSource.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/conditions/ArchConditions.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/library/dependencies/syntax/GivenNamedSlices.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/extension/EvaluatedRule.java

* /opt/cola/permits/1290493552_1647560221.4/0/archunit-0-22-0-sources-
jar/com/tngtech/archunit/lang/ArchRule.java

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jar/com/google/gson/internal/bind/TreeTypeAdapter.java
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jar/com/google/gson/stream/JsonScope.java
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jar/com/google/gson/stream/JsonReader.java
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jar/com/google/gson/stream/MalformedJsonException.java
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jar/com/google/gson/JsonStreamParser.java
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1.270 jackson-bom 2.13.3

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1.271 jersey-ext-bean-validation 2.25.1

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1.272 servicelocator-default-implementation 2.5.0-b32

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1.273 pact-jvm-model 3.5.17

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1.274 prometheus-java-simpleclient-common 0.5.0

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* /opt/cola/permits/1354023277_1657242058.336974/0/simpleclient-common-0-5-0-jar/META-INF/maven/io.prometheus/simpleclient_common/pom.xml
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Manifest-Version: 1.0
Bnd-LastModified: 1532943481022
Build-Jdk: 1.8.0_162
Built-By: bbrazil
Bundle-Description: Common code used by various modules of the Simplecli
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Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.txt
Bundle-ManifestVersion: 2
Bundle-Name: Prometheus Java Simpleclient Common
Bundle-SymbolicName: io.prometheus.simpleclient_common
Bundle-Version: 0.5.0
Created-By: Apache Maven Bundle Plugin
Export-Package: io.prometheus.client.exporter.common;uses:="io.prometheu
s.client";version="0.5.0"
Import-Package: io.prometheus.client;version="[0.5,1)"
Tool: Bnd-2.1.0.20130426-122213

Found in path(s):
* /opt/cola/permits/1354023277_1657242058.336974/0/simpleclient-common-0-5-0-jar/META-INF/MANIFEST.MF

1.275 joda-time 2.8.1

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1.277 byte-buddy 1.12.2

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analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
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* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/HashingSource.java
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* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-
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jar/okio/RealBufferedSink.java
* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/BufferedSink.java
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* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/Sink.java
* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/Okio.java

* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/GzipSink.java

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* /opt/ws_local/PERMITS_SQL/1018348639_1594201437.99/0/okio-1-13-0-sources-jar/okio/GzipSource.java

1.282 jpowershell 2.0

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* /opt/cola/permits/1354022803_1658975626.736453/0/jpowershell-2-0-sources-jar/com/profesorfalken/jpowershell/PowerShellCodepage.java
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* /opt/cola/permits/1354022803_1658975626.736453/0/jpowershell-2-0-sources-
jar/com/profesorfalken/jpowershell/PowerShellNotAvailableException.java

* /opt/cola/permits/1354022803_1658975626.736453/0/jpowershell-2-0-sources-
jar/com/profesorfalken/jpowershell/PowerShellCommandProcessor.java

* /opt/cola/permits/1354022803_1658975626.736453/0/jpowershell-2-0-sources-
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1.283 grizzly-http 2.3.28

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1.284 jna 5.5.0

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  table, the facility still operates, and performs whatever part of
  its purpose remains meaningful.

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  be optional: if the application does not supply it, the square
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 If distribution of object code is made by offering access to copy
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 5. A program that contains no derivative of any portion of the
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work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

 However, linking a "work that uses the Library" with the Library
creates an executable that is a derivative of the Library (because it
contains portions of the Library), rather than a "work that uses the
library". The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

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that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
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threshold for this to be true is not precisely defined by law.

 If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
file is unrestricted, regardless of whether it is legally a derivative
work. (Executables containing this object code plus portions of the
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 Otherwise, if the work is a derivative of the Library, you may
distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.

 6. As an exception to the Sections above, you may also combine or
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with the Library, with the complete machine-readable "work that
uses the Library", as object code and/or source code, so that the
user can modify the Library and then relink to produce a modified
executable containing the modified Library. (It is understood
that the user who changes the contents of definitions files in the
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to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the
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copy of the library already present on the user's computer system,
rather than copying library functions into the executable, and (2)
will operate properly with a modified version of the library, if
the user installs one, as long as the modified version is
interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at
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d) If distribution of the work is made by offering access to copy
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e) Verify that the user has already received a copy of these
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2000-05-05

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Modified by Atlassian

The binary file of the original library has been modified by Atlassian in such way that classes have changed
their package names from 'com.keypoint/org.jfree' to 'clover.com.keypoint/clover.org.jfree'. This was
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(For example, a function in a library to compute square roots has
a purpose that is entirely well-defined independent of the
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application-supplied function or table used by this function must
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No source code of the original library was modified.
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The primary ANTLR guy:

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The binary file of the original library has been modified by Atlassian in such way that classes have changed
their package name from 'com.google.common' to 'clover.com.google.common'. This was necessary to
avoid potential name conflicts during instrumentation of a code using the original library when using Clover.
No source code of the original library was modified.
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 5. A program that contains no derivative of any portion of the
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Whether this is true is especially significant if the work can be
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 If such an object file uses only numerical parameters, data
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functions (ten lines or less in length), then the use of the object
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 Otherwise, if the work is a derivative of the Library, you may
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.
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their package names from the 'org.apache.commons' to the 'clover.org.apache.commons'. This was necessary to
avoid potential name conflicts during instrumentation of a code using the original library when using Clover.
No source code of the original library was modified.
==

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/*
File: Core.js

Description:

Provides common utility functions and the Class object used internally by the library.

Also provides the <TreeUtil> object for manipulating JSON tree structures

Some of the Basic utility functions and the Class system are based in the MooTools Framework
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Version:

1.1.2

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* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
jar/org/jooq/lambda/fi/util/function/CheckedPredicate.java
* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
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* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
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* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-jar/org/jooq/lambda/Unchecked.java
* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
jar/org/jooq/lambda/UncheckedException.java
* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
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* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
jar/org/jooq/lambda/fi/util/function/CheckedFunction.java
* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
jar/org/jooq/lambda/fi/util/function/CheckedSupplier.java
* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-
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* /opt/cola/permits/1290493546_1647560268.44/0/jool-0-9-11-sources-jar/org/jooq/lambda/tuple/Tuple15.java

1.289 jersey-test-framework-provider-grizzly2 2.25.1

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jar/net/jpountz/lz4/LZ4DecompressorWithLength.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/lz4/LZ4CompressorWithLength.java
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* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/package.html

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* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/XXHash64.java

* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/StreamingXXHash64JNI.java

* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/StreamingXXHash64.java

* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/AbstractStreamingXXHash64Java.java

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jar/net/jpountz/lz4/LZ4FrameInputStream.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/lz4/LZ4FrameOutputStream.java
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jar/net/jpountz/xxhash/XXHash32.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/lz4/LZ4BlockOutputStream.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/util/UnsafeUtils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/lz4/LZ4BlockInputStream.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/util/ByteBufferUtils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-
jar/net/jpountz/lz4/LZ4Decompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/util/Utils.java

* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4JNICompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4Compressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/XXHashJNI.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/util/SafeUtils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/StreamingXXHash32.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/StreamingXXHash32JNI.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/XXHash32JNI.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4SafeDecompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/util/Native.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4Exception.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4Factory.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4UnsafeUtils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4JNI.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/AbstractStreamingXXHash32Java.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/XXHashFactory.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4ByteBufferUtils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4FastDecompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4JNISafeDecompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4UnknownSizeDecompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4Constants.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/xxhash/XXHashConstants.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4JNIFastDecompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4Utils.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4HCJNICompressor.java
* /opt/cola/permits/1340816063_1654804394.0569026/0/lz4-java-1-8-0-sources-jar/net/jpountz/lz4/LZ4SafeUtils.java

1.292 saxon-xslt-and-xquery-processor 10.3

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1.293 docker-java-transport 3.2.13

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1.294 elasticsearch-logging 8.4.3

1.295 metrics-integration-for-logback 4.0.5

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Manifest-Version: 1.0

Bnd-LastModified: 1545938197549

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: An instrumented appender for Logback.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Integration for Logback

Bundle-SymbolicName: io.dropwizard.metrics.logback

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.logback;uses:="ch.qos.logback.cla

ssic.spi,ch.qos.logback.core,com.codahale.metrics";version="4.0.5"

Implementation-Title: Metrics Integration for Logback

Implementation-URL: http://metrics.dropwizard.io/metrics-logback

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: ch.qos.logback.classic;version="[1.2,2)",ch.qos.logbac

k.classic.spi;version="[1.2,2)",ch.qos.logback.core;version="[1.2,2)"

,com.codahale.metrics;version="[4.0,5)"

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274703759_1648835827.62/0/metrics-logback-4-0-5-jar/META-INF/MANIFEST.MF

1.296 apache-commons-text 1.9

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jar/com/clearspring/analytics/stream/membership/BloomCalculations.java
* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/stream/membership/BloomFilter.java
* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/stream/membership/DataInputBuffer.java
* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/stream/membership/ICompactSerializer.java
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jar/com/clearspring/analytics/util/Varint.java
* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/hash/Lookup3Hash.java
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jar/com/clearspring/analytics/stream/membership/BitSetSerializer.java
* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
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jar/com/clearspring/analytics/hash/MurmurHash.java
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jar/com/clearspring/analytics/stream/membership/DataOutputBuffer.java

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jar/com/clearspring/analytics/stream/frequency/CountMinSketch.java

* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-

jar/com/clearspring/analytics/stream/frequency/ConservativeAddSketch.java

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jar/com/clearspring/analytics/util/Lists.java

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jar/com/clearspring/analytics/util/Preconditions.java

* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/stream/quantile/TDigest.java

* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-
jar/com/clearspring/analytics/stream/quantile/GroupTree.java

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jar/com/clearspring/analytics/util/AbstractIterator.java

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jar/com/clearspring/analytics/stream/cardinality/CountThenEstimate.java

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jar/com/clearspring/analytics/stream/cardinality/CardinalityMergeException.java

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jar/com/clearspring/analytics/util/TopK.java

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jar/com/clearspring/analytics/stream/StreamSummary.java

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* /opt/cola/permits/1354022809_1656537262.7246666/0/stream-lib-3-0-0-sources-1-jar/com/clearspring/analytics/stream/ITopK.java

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jar/com/clearspring/analytics/stream/cardinality/RegisterSet.java
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jar/com/clearspring/analytics/stream/cardinality/HyperLogLog.java
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jar/com/clearspring/analytics/stream/cardinality/HyperLogLogPlus.java
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1.298 powermock-module-testng 2.0.0

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* /opt/cola/permits/1354022617_1656537250.0070186/0/powermock-module-testng-2-0-0-sources-
jar/org/powermock/modules/testng/internal/TestNGMockClassLoaderFactory.java
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jar/org/powermock/modules/testng/internal/TestClassInstanceFactory.java
* /opt/cola/permits/1354022617_1656537250.0070186/0/powermock-module-testng-2-0-0-sources-
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* /opt/cola/permits/1354022617_1656537250.0070186/0/powermock-module-testng-2-0-0-sources-jar/org/powermock/modules/testng/internal/PowerMockTestNGMethodHandler.java

1.299 checker-qual 3.1.0

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1.304 hikaricp 2.4.13

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* /opt/cola/permits/1112432488_1614930977.6/0/hikaricp-java7-2-4-13-sources-2-
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jar/com/zaxxer/hikari/metrics/dropwizard/CodahaleMetricsTrackerFactory.java
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jar/com/zaxxer/hikari/metrics/MetricsTrackerFactory.java
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* /opt/cola/permits/1112432488_1614930977.6/0/hikaricp-java7-2-4-13-sources-2-jar/com/zaxxer/hikari/metrics/prometheus/PrometheusMetricsTrackerFactory.java
* /opt/cola/permits/1112432488_1614930977.6/0/hikaricp-java7-2-4-13-sources-2-jar/com/zaxxer/hikari/pool/PoolBase.java
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* /opt/cola/permits/1112432488_1614930977.6/0/hikaricp-java7-2-4-13-sources-2-
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1.305 jackson-dataformat-yaml 2.10.3

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1.311 selenium 2.41.0

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Metadata-Version: 1.0
Name: selenium
Version: 2.41.0
Summary: Python bindings for Selenium
Home-page: http://code.google.com/p/selenium/
Author: UNKNOWN
Author-email: UNKNOWN
License: UNKNOWN
Description: =====================
    Selenium Client Driver
    =====================

    Introduction
    ============

    Python language bindings for Selenium WebDriver.

    The `selenium` package is used automate web browser interaction from Python.

    +-----------+--+
    | **Home**: | http://www.seleniumhq.org |
    +-----------+--+
    | **Docs**: | `selenium package API <http://selenium.googlecode.com/git/docs/api/py/api.html>`_ |
    +-----------+--+
    | **Dev**: | https://code.google.com/p/selenium/ |
    +-----------+--+
    | **PyPI**: | https://pypi.python.org/pypi/selenium |
    +-----------+--+
    | **IRC**: | **#selenium** channel on freenode |
    +-----------+--+

Several browsers/drivers are supported (Firefox, Chrome, Internet Explorer, PhantomJS), as well as the Remote protocol.

Supported Python Versions
==========================

* Python 2.6, 2.7
* Python 3.2, 3.3

Installing
==========

If you have `pip <http://www.pip-installer.org>`_ on your system, you can simply install or upgrade the Python bindings::

    pip install -U selenium

Alternately, you can download the source distribution from `PyPI <http://pypi.python.org/pypi/selenium>`_ (e.g. selenium-2.41.tar.gz), unarchive it, and run::

    python setup.py install

Note: both of the methods described above install `selenium` as a system-wide package That will require administrative/root access to ther machine. You may consider using a `virtualenv <http://www.virtualenv.org/>`_ to create isolated Python environments instead.

Example 0:
==========

* open a new Firefox browser
* load the page at the given URL

::

    from selenium import webdriver

    browser = webdriver.Firefox()
    browser.get('http://seleniumhq.org/')

Example 1:
==========

* open a new Firefox browser
* load the Yahoo homepage
* search for "seleniumhq"
* close the browser

::

```
from selenium import webdriver
from selenium.webdriver.common.keys import Keys

browser = webdriver.Firefox()

browser.get('http://www.yahoo.com')
assert 'Yahoo!' in browser.title

elem = browser.find_element_by_name('p')  # Find the search box
elem.send_keys('seleniumhq' + Keys.RETURN)

browser.quit()
```

Example 2:
==========

Selenium WebDriver is often used as a basis for testing web applications. Here is a simple example uisng Python's standard `unittest <http://docs.python.org/3/library/unittest.html>`_ library:

::

```
import unittest

class GoogleTestCase(unittest.TestCase):

    def setUp(self):
        self.browser = webdriver.Firefox()
        self.addCleanup(self.browser.quit)

    def testPageTitle(self):
        self.browser.get('http://www.google.com')
        self.assertIn('Google', self.browser.title)

if __name__ == '__main__':
    unittest.main(verbosity=2)
```

Selenium Server (optional)
==========================

For normal WebDriver scripts (non-Remote), the Java server is not needed.

However, to use Selenium Webdriver Remote or the legacy Selenium API (Selenium-RC), you need to also run the Selenium server. The server requires a Java Runtime Environment (JRE).

Download the server separately, from: http://selenium-release.storage.googleapis.com/2.41/selenium-server-standalone-2.41.0.jar

Run the server from the command line::

    java -jar selenium-server-standalone-2.41.0.jar

Then run your Python client scripts.

Use The Source Luke!
====================

View source code online:

    +-----------+---+
    | official: | https://code.google.com/p/selenium/source/browse/py |
    +-----------+---+
    | mirror: | https://github.com/SeleniumHQ/selenium/tree/master/py |
    +-----------+---+

Platform: UNKNOWN
Classifier: Development Status :: 5 - Production/Stable
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Classifier: Programming Language :: Python :: 2.6
Classifier: Programming Language :: Python :: 2.7
Classifier: Programming Language :: Python :: 3.2
Classifier: Programming Language :: Python :: 3.3

Found in path(s):
* /opt/cola/permits/1354022257_1656537397.892328/0/selenium-2-41-0-tar-gz/selenium-2.41.0/selenium.egg-info/PKG-INFO
* /opt/cola/permits/1354022257_1656537397.892328/0/selenium-2-41-0-tar-gz/selenium-2.41.0/PKG-INFO

1.312 apache-ant 1.9.7

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```
tree grammar BlockSetTransformer;
options {
 language    = Java;
 tokenVocab  = ANTLRParser;
 ASTLabelType = GrammarAST;
 output   = AST;
 filter   = true;
}

@header {
package org.antlr.v4.parse;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.List;
import java.util.Set;
import java.util.HashSet;
import java.util.ArrayList;
import org.antlr.v4.runtime.misc.IntervalSet;
}

@members {
public String currentRuleName;
public GrammarAST currentAlt;
public Grammar g;
public BlockSetTransformer(TreeNodeStream input, Grammar g) {
  this(input, new RecognizerSharedState());
  this.g = g;
}
}

topdown
  : ^(RULE (id=TOKEN_REF|id=RULE_REF) {currentRuleName=$id.text;} .+)
  | setAlt
  | ebnfBlockSet
  | blockSet
;

setAlt
 : {inContext("RULE BLOCK")}?
  ALT {currentAlt = $start;}
 ;

// (BLOCK (ALT (+ (BLOCK (ALT INT) (ALT ID)))))
ebnfBlockSet
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
```

```
  }
 : ^(ebnfSuffix blockSet) -> ^(ebnfSuffix ^(BLOCK<BlockAST> ^(ALT<AltAST> blockSet)))
 ;

ebnfSuffix
@after {$tree = (GrammarAST)adaptor.dupNode($start);}
 : OPTIONAL
 | CLOSURE
  | POSITIVE_CLOSURE
 ;

blockSet
@init {
boolean inLexer = Grammar.isTokenName(currentRuleName);
}
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : {inContext("RULE")}? // top-level: rule block and > 1 alt
  ^(BLOCK ^(alt=ALT elementOptions? {((AltAST)$alt).altLabel==null}? setElement[inLexer]) ( ^(ALT
elementOptions? setElement[inLexer]) )+)
  -> ^(BLOCK<BlockAST>[$BLOCK.token] ^(ALT<AltAST>[$BLOCK.token,"ALT"] ^(SET[$BLOCK.token,
"SET"] setElement+)))
 | {!inContext("RULE")}? // if not rule block and > 1 alt
  ^(BLOCK ^(ALT elementOptions? setElement[inLexer]) ( ^(ALT elementOptions? setElement[inLexer]) )+)
  -> ^(SET[$BLOCK.token, "SET"] setElement+)
 ;

setElement[boolean inLexer]
@after {
 GrammarTransformPipeline.setGrammarPtr(g, $tree);
}
 : ( ^(a=STRING_LITERAL elementOptions) {!inLexer ||
CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  |  a=STRING_LITERAL {!inLexer || CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1}?
  | {!inLexer}?=> ^(TOKEN_REF elementOptions)
  | {!inLexer}?=>  TOKEN_REF
  | {inLexer}?=> ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
   {CharSupport.getCharValueFromGrammarCharLiteral($a.getText())!=-1 &&
   CharSupport.getCharValueFromGrammarCharLiteral($b.getText())!=-1}?
  )
 ;

elementOptions
 : ^(ELEMENT_OPTIONS elementOption*)
 ;

elementOption
```

```
  : ID
  | ^(ASSIGN id=ID v=ID)
  | ^(ASSIGN ID v=STRING_LITERAL)
  | ^(ASSIGN ID v=ACTION)
  | ^(ASSIGN ID v=INT)
  ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/parse/BlockSetTransformer.g
No license file was found, but licenses were detected in source scan.

```
/*
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ATNBuilder.java
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```
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/GrammarRootAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/OutputModelWalker.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/SerializedATN.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/gui/PostScriptDocument.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/GrammarASTWithOptions.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ToolMessage.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LL1AltBlock.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/misc/EscapeSequenceParsing.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Recognizer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/MatchNotSet.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/LexerGrammar.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Wildcard.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ActionText.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/automata/LexerATNFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenTypeDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/analysis/LeftRecursiveRuleAltInfo.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/Target.java
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/GrammarToken.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/OutputModelController.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ErrorSeverity.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/gui/TestRig.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/VisitorDispatchMethod.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/DispatchMethod.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/RuleRefAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/StarBlock.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-

jar/org/antlr/v4/tool/GrammarSyntaxMessage.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/chunk/TokenRef.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/RangeAST.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/ArgAction.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/ANTLRToolListener.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/target/Python3Target.java

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jar/org/antlr/v4/codegen/model/ExceptionClause.java

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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/misc/MutableInt.java

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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/BlockAST.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/AttributeResolver.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ScopeParser.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/CodeBlockForAlt.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/ast/OptionalBlockAST.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ErrorManager.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/decl/ContextTokenListIndexedGetterDecl.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/decl/AttributeDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/Grammar.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/AltAST.java
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Sync.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/RuleAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/semantics/UseDefAnalyzer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/AddToLabelList.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LL1OptionalBlockSingleAlt.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/BaseVisitorFile.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/ListenerDispatchMethod.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/v4ParserException.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/LocalRef.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/GrammarSemanticsMessage.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/GrammarASTAdaptor.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenListDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/RuleElementAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/GrammarASTErrorNode.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/NonLocalAttrRef.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/ElementListDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/OutputModelFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_start.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_start.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/misc/Graph.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/InvokeRule.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_int.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/Tool.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/automata/ATNOptimizer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Lexer.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/PlusBlock.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/Python2Target.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/JavaTarget.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/RuleSempredFunction.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_text.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/LexerFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/semantics/SymbolCollector.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/GrammarParserInterpreter.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/ContextRuleGetterDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ToolANTLRLexer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LexerFile.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LabeledOp.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/CSharpTarget.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/TestSetInline.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/ContextTokenListGetterDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/gui/TreeViewer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/LabelType.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/misc/FrequencySet.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/GrammarAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/UnicodeEscapes.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/automata/ATNPrinter.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/DefaultToolListener.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/ContextRuleListGetterDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/Attribute.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/CodeBlockForOuterMostAlt.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/QuantifierAST.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/semantics/SymbolChecks.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/MatchToken.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/ThrowRecognitionException.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/ParserFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/DefaultOutputModelFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/ThrowNoViableAlt.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/gui/SystemFontMetrics.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/CaptureNextTokenType.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/LeftRecursionCyclesMessage.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/chunk/SetAttr.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_channel.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/automata/ATNFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/unicode/UnicodeDataTemplateController.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/semantics/BlankActionSplitterListener.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_parser.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/decl/AltLabelStructDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/analysis/LeftRecursiveRuleAnalyzer.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/model/chunk/ArgRef.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/BuildDependencyGenerator.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/GrammarTransformPipeline.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/gui/TreeLayoutAdaptor.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/GrammarInterpreterRuleContext.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/semantics/SemanticPipeline.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/gui/TreeTextProvider.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ToolANTLRParser.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/CodeBlock.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/CppTarget.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_type.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/Decl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/TokenVocabParser.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/TokenDecl.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/semantics/AttributeChecks.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/JavaScriptTarget.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/automata/ParserATNFactory.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ActionSplitterListener.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Choice.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/Loop.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/ActionTranslator.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/NotAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/Rule.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/StarBlockAST.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/ParserFile.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/CaptureNextToken.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/TokenPropertyRef_pos.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ListLabelRef.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/ElementFrequenciesVisitor.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/RuleActionFunction.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LeftRecursiveRuleFunction.java
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-

jar/org/antlr/v4/codegen/model/OutputFile.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/LL1Loop.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/MatchSet.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/Alternative.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/BlankOutputModelFactory.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/target/GoTarget.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ThisRulePropertyRef_stop.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/ThrowEarlyExitException.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/decl/RuleContextDecl.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/SemPred.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/LeftRecursiveRule.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_ctx.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/ActionChunk.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/SrcOp.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/codegen/model/chunk/RulePropertyRef_text.java

* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/ast/PlusBlockAST.java

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```
SwiftTypeInitMap ::= [
 "Int":"0",
 "Int64":"0",
 "Float":"0.0",
 "Double":"0.0",
 "Bool":"false",
 default:"nil" // anything other than a primitive type is an object
]
SwiftTypeMap ::= [
 "int":"Int",
 "float":"Float",
 "long":"Int64",
 "double":"Double",
 "bool":"Bool",
 "boolean":"Bool",
 default : key
]
// args must be <object-model-object>, <fields-resulting-in-STs>

accessLevelOpenOK(obj) ::= "<obj.accessLevel; null=\"open\">"
accessLevelNotOpen(obj) ::= "<obj.accessLevel; null=\"public\">"


ParserFile(file, parser, namedActions,contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4


<parser>
>>
```

```
ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4

/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
<accessLevelNotOpen(file)> protocol <file.grammarName>Listener: ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
 * Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 - Parameters:
   - ctx: the parse tree
 */
func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname; format="cap">Context)}; separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>

import Antlr4
```

```
/**
 * This class provides an empty implementation of {@link <file.grammarName>Listener},
 * which can be extended to create a listener which only needs to handle a subset
 * of the available methods.
 */
<accessLevelOpenOK(file)> class <file.grammarName>BaseListener: <file.grammarName>Listener {
   <accessLevelNotOpen(file)> init() { \}
 <file.listenerNames:{lname |

/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
<accessLevelOpenOK(file)> func enter<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) { \}
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation does nothing.\</p>
 */
<accessLevelOpenOK(file)> func exit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) { \}}; separator="\n">

 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func enterEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func exitEveryRule(_ ctx: ParserRuleContext) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 <accessLevelOpenOK(file)> func visitTerminal(_ node: TerminalNode) { }
 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
```

```
  <accessLevelOpenOK(file)> func visitErrorNode(_ node: ErrorNode) { }
}
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4


/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>Visitor\<T>: ParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
* Visit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
* Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
- Parameters:
 - ctx: the parse tree
- returns: the visitor result
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T {
 fatalError(#function + " must be overridden")
\}
}; separator="\n">
}
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
<!package <file.genPackage>;!>
<endif>
<header>
import Antlr4
```

```
/**
* This class provides an empty implementation of {@link <file.grammarName>Visitor},
* which can be extended to create a visitor which only needs to handle a subset
* of the available methods.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
<accessLevelOpenOK(file)> class <file.grammarName>BaseVisitor\<T>: AbstractParseTreeVisitor\<T> {
 <file.visitorNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation returns the result of calling
* {@link #visitChildren\} on {@code ctx\}.\</p>
*/
<accessLevelOpenOK(file)> func visit<lname; format="cap">(_ ctx: <file.parserName>.<lname;
format="cap">Context) -> T? { return visitChildren(ctx) \}}; separator="\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<!//@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})!>
<accessLevelOpenOK(parser)> class <parser.name>: <superClass; null="Parser"> {

 internal static var _decisionToDFA: [DFA] = {
      var decisionToDFA = [DFA]()
      let length = <parser.name>._ATN.getNumberOfDecisions()
      for i in 0..\<length {
       <!// decisionToDFA[i] = DFA(<parser.name>._ATN.getDecisionState(i)!, i);!>
        decisionToDFA.append(DFA(<parser.name>._ATN.getDecisionState(i)!, i))
        }
       return decisionToDFA
    }()

 internal static let _sharedContextCache = PredictionContextCache()

 <if(parser.tokens)>
 <accessLevelNotOpen(parser)>
 enum Tokens: Int {
```

```
   case EOF = -1, <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>
}
    <endif>


<accessLevelNotOpen(parser)>
static let <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>


<accessLevelNotOpen(parser)>
static let ruleNames: [String] = [
 <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]


<vocabulary(parser.literalNames, parser.symbolicNames,
             accessLevelNotOpen(parser))>


override <accessLevelOpenOK(parser)>
func getGrammarFileName() -> String { return "<parser.grammarFileName; format="java-escape">" }


override <accessLevelOpenOK(parser)>
func getRuleNames() -> [String] { return <parser.name>.ruleNames }


override <accessLevelOpenOK(parser)>
func getSerializedATN() -> String { return <parser.name>._serializedATN }


override <accessLevelOpenOK(parser)>
func getATN() -> ATN { return <parser.name>._ATN }


<namedActions.members>
<parser:(ctor)()>
<funcs; separator="\n">


<if(sempredFuncs)>
 override <accessLevelOpenOK(parser)>
 func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int, _ predIndex: Int)throws -> Bool {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case  <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
    default: return true
  }
  <!return true;!>
 }
<sempredFuncs.values; separator="\n">
<endif>


<atn>


<accessLevelNotOpen(parser)>
```

```
    static let _serializedATN = <parser.name>ATN().jsonString

 <accessLevelNotOpen(parser)>
 static let _ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
 }
 >>

 vocabulary(literalNames, symbolicNames, accessLevel) ::= <<
 private static let _LITERAL_NAMES: [String?] = [
 <literalNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
 ]
 private static let _SYMBOLIC_NAMES: [String?] = [
 <symbolicNames:{t | <t>}; null="nil", separator=", ", wrap, anchor>
 ]
 <accessLevel>
 static let VOCABULARY = Vocabulary(_LITERAL_NAMES, _SYMBOLIC_NAMES)
 >>

 dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
 <if(actionFuncs)>
 override <accessLevelOpenOK(parser)>
 func action(_ _localctx: RuleContext?, _ ruleIndex: Int, _ actionIndex: Int) throws {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
 case <f.ruleIndex>:
 <f.name>_action((_localctx as <f.ctxType>?), actionIndex)
  }; separator="\n">
 default: break
  }
 }
 <actionFuncs.values; separator="\n">
 <endif>
 <if(sempredFuncs)>
 override <accessLevelOpenOK(parser)>
 func sempred(_ _localctx: RuleContext?, _ ruleIndex: Int,_  predIndex: Int) throws -> Bool {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
 case <f.ruleIndex>:
 return try <f.name>_sempred(_localctx?.castdown(<f.ctxType>.self), predIndex)}; separator="\n">
 default: return true
  }
 <!return true;!>
 }
 <sempredFuncs.values; separator="\n">
 <endif>
 >>

 parser_ctor(p) ::= <<
```

```
override <accessLevelOpenOK(parser)>
func getVocabulary() -> Vocabulary {
   return <p.name>.VOCABULARY
}

override <accessLevelNotOpen(parser)>
init(_ input:TokenStream) throws {
   RuntimeMetaData.checkVersion("4.8", RuntimeMetaData.VERSION)
 try super.init(input)
 _interp = ParserATNSimulator(self,<p.name>._ATN,<p.name>._decisionToDFA,
<parser.name>._sharedContextCache)
}

>>

/* This generates a private method since the actionIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private func <r.name>_action(_ _localctx: <r.ctxType>?,  _ actionIndex: Int) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
  }; separator="\n">
 default: break
 }
}
>>

/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private func <r.name>_sempred(_ _localctx: <r.ctxType>!,  _ predIndex: Int) throws -> Bool {
 switch (predIndex) {
 <actions:{index|
  case <index>:return <actions.(index)>}; separator="\n">
    default: return true
 }
 <!return true;!>
}
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<
<ruleCtx>
```

```
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">
@discardableResult
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelOpenOK(parser)> func
<endif><currentRule.name>(<if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType> {
 var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>)
 try enterRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>)
 <namedActions.init>
 <locals; separator="\n">
 defer {
    <finallyAction>
    try! exitRule()
  }
 do {
<if(currentRule.hasLookaheadBlock)>
 var _alt:Int
<endif>
  <code>
 <postamble; separator="\n">
  <namedActions.after>
 }
 <if(exceptions)>
 <exceptions; separator="\n">
 <else>
 catch ANTLRException.recognition(let re) {
 _localctx.exception = re
 _errHandler.reportError(self, re)
 try _errHandler.recover(self, re)
 }
 <endif>

 return _localctx
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else> <accessLevelNotOpen(parser)> final <endif>
func <currentRule.name>( <if(first(args))>_ <endif><args; separator=", _">) throws -> <currentRule.ctxType>  {
 return try <currentRule.name>(0<currentRule.args:{a | , <a.name>}>)
}
@discardableResult
private func <currentRule.name>(_ _p<args:{a | , <a>}>: Int) throws -> <currentRule.ctxType>  {
```

```
let _parentctx: ParserRuleContext? = _ctx
var _parentState: Int = getState()
var _localctx: <currentRule.ctxType> = <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>)
var _prevctx: <currentRule.ctxType> = _localctx
var _startState: Int = <currentRule.startState>
try enterRecursionRule(_localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p)
<namedActions.init>
<locals; separator="\n">
defer {
   <finallyAction>
   try! unrollRecursionContexts(_parentctx)
 }
do {
<if(currentRule.hasLookaheadBlock)>
 var _alt: Int
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch ANTLRException.recognition(let re) {
 _localctx.exception = re
 _errHandler.reportError(self, re)
 try _errHandler.recover(self, re)
 }

 return _localctx;
 }
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx =  <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
try enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<!//{!>
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
<!//}!>
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
```

```
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt | <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (<parser.name>.Tokens(rawValue: try _input.LA(1))!) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break}; separator="\n">
default:
 break
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>)
 try _errHandler.sync(self)
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>) <! alt block decision !>
```

```
try _errHandler.sync(self)
<preamble; separator="\n">
repeat {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 <iteration>
} while (<loopExpr>)
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = try _input.LT(1)<endif>
<preamble; separator="\n">
switch(try getInterpreter().adaptivePredict(_input,<choice.decision>, _ctx)) {
<alts:{alt |
case <i>:
 <alt>
 break}; separator="\n">
default: break
}
>>

OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
switch (try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
default: break
}
>>

StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>)
try _errHandler.sync(self)
_alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
while (_alt != <choice.exitAlt> && _alt != ATN.INVALID_ALT_NUMBER) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>)
```

```
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
}
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
try _errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
repeat {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 try _errHandler.sync(self)
 _alt = try getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx)
} while (_alt != <choice.exitAlt> && _alt !=  ATN.INVALID_ALT_NUMBER)
>>


Sync(s) ::= "sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw ANTLRException.recognition(e: NoViableAltException(self))"


TestSetInline(s) ::= <<
<!<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">!>
//closure
{ () -> Bool in
    <if(rest(s.bitsets))>var<else>let<endif> testSet: Bool = <first(s.bitsets):{bits |
<if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s, bits)><endif>}>
      <rest(s.bitsets):{bits | testSet = testSet || <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s,
bits)><else><bitsetInlineComparison(s, bits)><endif>}; separator="\n">
    return testSet
}()
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <<
```

```
<!(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1 \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1 \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)!>
{  () -> Bool in
  <! let test: Bool = (<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>)!>
  <!var temp: Int64 =  Int64(<offsetShift(s.varName, bits.shift)>)!>
  <!temp = (temp \< 0) ? (64 + (temp % 64 )) : (temp % 64)!>
  <!let test1: Int64 = (Int64(1) \<\< temp)!>
  <!var test2: Int64 = (<first(bits.ttypes):{ttype | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)}>)!>
  <!<rest(bits.ttypes):{ttype | test2 = test2 | Utils.bitLeftShift(<offsetShift(parserName(ttype), bits.shift)>)};
separator="\n">!>
  let testArray: [Int] = [<s.varName>, <bits.ttypes:{ttype |<parserName(ttype)>}; separator=",">]
  <!var test2: Int64 = Utils.testBitLeftShiftArray(testArray)!>
   return  Utils.testBitLeftShiftArray(testArray, <bits.shift>)
}()
>>


isZero ::= [
"0": true,
default: false
]
parserName(ttype) ::= <%
<parser.name>.Tokens.<ttype>.rawValue
%>
offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName> == <parser.name>.Tokens.<ttype>.rawValue}; separator=" || ">
%>


cases(ttypes) ::= <<
<trunc(ttypes): {t | case .<t>:fallthrough}  ; separator="\n">
<last(ttypes): {t | case .<t>:}  ; separator="\n">
>>


InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>)
<if(r.labels)>
try {
 let assignmentValue = try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)
 <r.labels:{l | <labelref(l)> = assignmentValue} ; separator="\n">
   }()
<else>try
<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>)<endif>
>>
```

```
MatchToken(m) ::= <<
setState(<m.stateNumber>)
<if(m.labels)>
try {
  let assignmentValue = try match(<parser.name>.Tokens.<m.name>.rawValue)
  <m.labels:{l | <labelref(l)> = assignmentValue}  ; separator="\n">
    }()
<else>try match(<parser.name>.Tokens.<m.name>.rawValue)<endif>
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>)
<if(m.labels)><m.labels:{l | <labelref(l)> = }>try _input.LT(1)<endif>
<capture>
if (<if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>)) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>try _errHandler.recoverInline(self)<if(m.labels)> as
Token<endif>
}
else {
 _errHandler.reportMatch(self)
 try consume()
}
>>


Wildcard(w) ::= <<
setState(<w.stateNumber>)
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>try matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>)
if (!(<chunks>)) {
  throw ANTLRException.recognition(e:FailedPredicateException(self, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>))
}
>>
```

```
ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()     ::= "skip()"
LexerMoreCommand()     ::= "more()"
LexerPopModeCommand()  ::= "popMode()"

LexerTypeCommand(arg)      ::= "_type = <arg>"
LexerChannelCommand(arg)   ::= "_channel = <arg>"
LexerModeCommand(arg)      ::= "_mode = <arg>"
LexerPushModeCommand(arg)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getText()! : \"\")"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getCharPositionInLine() : 0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> != nil ? <ctx(t)>.<t.label>!.getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> != nil ? Int(<ctx(t)>.<t.label>!.getText()!) : 0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.start?.description ?? \"\") : \"\")"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label> != nil ? (<ctx(r)>.<r.label>!.stop?.description ?? \"\") : \"\")"
RulePropertyRef_text(r)  ::= "(<ctx(r)>.<r.label> != nil ? try
_input.getText(<ctx(r)>.<r.label>!.start,<ctx(r)>.<r.label>!.stop) : \"\")"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "self"

ThisRulePropertyRef_start(r) ::= "_localctx.start"
```

```
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "(try _input.getText(_localctx.start, try _input.LT(-1)))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r)  ::= "self"


NonLocalAttrRef(s)  ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>"


AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"


TokenDecl(t) ::= "<t.name>: <SwiftTypeMap.(TokenLabelType())>!"
TokenTypeDecl(t) ::= "var <t.name>: Int = 0"
TokenListDecl(t) ::= "<t.name>: [Token] = [Token]()"
RuleContextDecl(r) ::= "<r.name>: <r.ctxName>!"
RuleContextListDecl(rdecl) ::= "<rdecl.name>: [<rdecl.ctxName>] = [<rdecl.ctxName>]()"


ContextTokenGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, 0)
 }
>>
ContextTokenListGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>() -> [TerminalNode] {
  return getTokens(<parser.name>.Tokens.<t.name>.rawValue)
 }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
 <accessLevelOpenOK(parser)>
 func <t.name>(_ i:Int) -> TerminalNode? {
  return getToken(<parser.name>.Tokens.<t.name>.rawValue, i)
 }
>>
ContextRuleGetterDecl(r) ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>() -> <r.ctxName>? {
  return getRuleContext(<r.ctxName>.self, 0)
 }
>>
ContextRuleListGetterDecl(r) ::= <<
 <accessLevelOpenOK(parser)>
 func <r.name>() -> [<r.ctxName>] {
  return getRuleContexts(<r.ctxName>.self)
 }
>>
ContextRuleListIndexedGetterDecl(r)  ::= <<
```

```
<accessLevelOpenOK(parser)>
func <r.name>(_ i: Int) -> <r.ctxName>? {
 return getRuleContext(<r.ctxName>.self, i)
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = try _input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = try _input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
      superClass={ParserRuleContext}) ::= <<

<accessLevelNotOpen(parser)> class <struct.name>:
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | <accessLevelOpenOK(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <! <if(ctorAttrs)> <accessLevelNotOpen(parser)> init(_ parent: ParserRuleContext,_ invokingState: Int) {
super.init(parent, invokingState)  }<endif> !>
 <if(ctorAttrs)>
 <accessLevelNotOpen(parser)> convenience init(_ parent: ParserRuleContext?, _ invokingState: Int<ctorAttrs:{a | ,
_ <a>}>) {
  self.init(parent, invokingState)
  <struct.ctorAttrs:{a | self.<a.name> = <a.name>;}; separator="\n">
 }
 <endif>

 override <accessLevelOpenOK(parser)>
 func getRuleIndex() -> Int {
  return <parser.name>.RULE_<struct.derivedFromName>
 }
<if(struct.provideCopyFrom && struct.attrs)> <! don't need copy unless we have subclasses !>
 <accessLevelOpenOK(parser)>
 override func copyFrom(_ ctx_: ParserRuleContext) {
  super.copyFrom(ctx_)
  let ctx = ctx_ as! <struct.name>
```

```
 <struct.attrs:{a | self.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
 }
 >>


 AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
 <accessLevelNotOpen(parser)> class <struct.name>: <currentRule.name; format="cap">Context {
 <attrs:{a | <accessLevelNotOpen(parser)> var <a>}; separator="\n">
 <getters:{g | <g>}; separator="\n">

 <accessLevelNotOpen(parser)>
 init(_ ctx: <currentRule.name; format="cap">Context) {
  super.init()
  copyFrom(ctx)
 }
 <dispatchMethods; separator="\n">
 }
 >>


 ListenerDispatchMethod(method) ::= <<
 override <accessLevelOpenOK(parser)>
 func <if(method.isEnter)>enter<else>exit<endif>Rule(_ listener: ParseTreeListener) {
  if let listener = listener as? <parser.grammarName>Listener {
   listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)
  }
 }
 >>


 VisitorDispatchMethod(method) ::= <<
 override <accessLevelOpenOK(parser)>
 func accept\<T>(_ visitor: ParseTreeVisitor\<T>) -> T? {
  if let visitor = visitor as? <parser.grammarName>Visitor {
     return visitor.visit<struct.derivedFromName; format="cap">(self)
  }
  else if let visitor = visitor as? <parser.grammarName>BaseVisitor {
     return visitor.visit<struct.derivedFromName; format="cap">(self)
  }
  else {
      return visitor.visitChildren(self)
  }
 }
 >>


 AttributeDecl(d) ::= "<d.name>: <SwiftTypeMap.(d.type)><if(d.initValue)> = <d.initValue><else>!<endif>"
```

```
/** If we don't know location of label def x, use this template (_localctx as! <x.ctx.name> */
labelref(x) ::= "<if(!x.isLocal)>_localctx.castdown(<x.ctx.name>.self).<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr?    */
ctx(actionChunk) ::= "_localctx.castdown(<actionChunk.ctx.name>.self)"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()                ::= "_ctx!.stop = try _input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.append(_prevctx)
<else>
_localctx.<label> = _prevctx
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = <currentAltLabel; format="cap">Context(  <ruleName; format="cap">Context(_parentctx,
_parentState))
<if(label)>
<if(isListLabel)>
(_localctx as! <currentAltLabel; format="cap">Context).<label>.append(_prevctx)
<else>
(_localctx as! <currentAltLabel; format="cap">Context).<label> = _prevctx
<endif>
<endif>
try pushNewRecursionContext(_localctx, _startState, <parser.name>.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = <ctxName>Context(_localctx)
_ctx = _localctx
_prevctx = _localctx
>>

recRuleSetPrevCtx() ::= <<
if _parseListeners != nil {
  try triggerExitRuleEvent()
}
_prevctx = _localctx
```

```
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
<!package <lexerFile.genPackage>;!>
<endif>
<namedActions.header>
import Antlr4


<lexer>
>>
Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<accessLevelOpenOK(lexer)> class <lexer.name>: <superClass; null="Lexer"> {

 internal static var _decisionToDFA: [DFA] = {
      var decisionToDFA = [DFA]()
      let length = <lexer.name>._ATN.getNumberOfDecisions()
      for i in 0..\<length {
       <! decisionToDFA[i] = DFA(<lexer.name>._ATN.getDecisionState(i)!, i);!>
          decisionToDFA.append(DFA(<lexer.name>._ATN.getDecisionState(i)!, i))
      }
       return decisionToDFA
   }()

 internal static let _sharedContextCache = PredictionContextCache()

 <accessLevelNotOpen(lexer)>
 static let <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>

 <if(lexer.channels)>
 <accessLevelNotOpen(lexer)>
 static let <lexer.channels:{k | <k>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>
 <endif>
 <if(rest(lexer.modes))>
 <accessLevelNotOpen(lexer)>
 static let <rest(lexer.modes):{m| <m>=<i>}; separator=", ", wrap, anchor>
 <endif>
 <accessLevelNotOpen(lexer)>
 static let channelNames: [String] = [
  "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ",
 wrap, anchor><endif>
 ]

 <accessLevelNotOpen(lexer)>
 static let modeNames: [String] = [
  <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
```

```
]

<accessLevelNotOpen(lexer)>
static let ruleNames: [String] = [
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
]

<vocabulary(lexer.literalNames, lexer.symbolicNames,
            accessLevelNotOpen(lexer))>

<namedActions.members>

override <accessLevelOpenOK(lexer)>
func getVocabulary() -> Vocabulary {
 return <lexer.name>.VOCABULARY
}

<accessLevelNotOpen(lexer)>
required init(_ input: CharStream) {
   RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION)
 super.init(input)
 _interp = LexerATNSimulator(self, <lexer.name>._ATN, <lexer.name>._decisionToDFA,
<lexer.name>._sharedContextCache)
 }

override <accessLevelOpenOK(lexer)>
func getGrammarFileName() -> String { return "<lexer.grammarFileName>" }

override <accessLevelOpenOK(lexer)>
func getRuleNames() -> [String] { return <lexer.name>.ruleNames }

override <accessLevelOpenOK(lexer)>
func getSerializedATN() -> String { return <lexer.name>._serializedATN }

override <accessLevelOpenOK(lexer)>
func getChannelNames() -> [String] { return <lexer.name>.channelNames }

override <accessLevelOpenOK(lexer)>
func getModeNames() -> [String] { return <lexer.name>.modeNames }

override <accessLevelOpenOK(lexer)>
func getATN() -> ATN { return <lexer.name>._ATN }

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>

<accessLevelNotOpen(lexer)>
static let _serializedATN: String = <lexer.name>ATN().jsonString
```

<accessLevelNotOpen(lexer)>
static let _ATN: ATN = ATNDeserializer().deserializeFromJson(_serializedATN)
}
>>

/** Don't need to define anything. The tool generates a XParserATN.swift file (and same for lexer)
 * which is referenced from static field _serializedATN. This json string is passed to
 * deserializeFromJson(). Note this is not the "serialization as array of ints" that other targets
 * do. It is more or less the output of ATNPrinter which gets read back in.
*/
SerializedATN(model) ::= <<
>>

/** Using a type to init value map, try to init a type; if not in table
* must be an object, default value is "null".
*/
initValue(typeName) ::= <<
<SwiftTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".swift"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/Swift/Swift.stg
No license file was found, but licenses were detected in source scan.

INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
*/
/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>(<line>,<column>)"

message(id, text) ::= "error <id> : <text>"

report(location, message, type) ::= "<location> : <type> <message.id> : <message.text>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/messages/formats/vs2005.stg
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]
* Copyright (c) 2012-2016 Terence Parr
* Copyright (c) 2012-2016 Sam Harwell
* All rights reserved.
*
* Redistribution and use in source and binary forms, with or without
* modification, are permitted provided that the following conditions
* are met:
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* IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
* OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
* IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,

```
tree grammar SourceGenTriggers;
options {
 language    = Java;
 tokenVocab  = ANTLRParser;
 ASTLabelType = GrammarAST;
}

@header {
package org.antlr.v4.codegen;
import org.antlr.v4.misc.Utils;
import org.antlr.v4.codegen.model.*;
import org.antlr.v4.codegen.model.decl.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.util.Collections;
import java.util.Map;
import java.util.HashMap;
}

@members {
 public OutputModelController controller;
  public boolean hasLookaheadBlock;
  public SourceGenTriggers(TreeNodeStream input, OutputModelController controller) {
   this(input);
   this.controller = controller;
  }
}

dummy : block[null, null] ;

block[GrammarAST label, GrammarAST ebnfRoot] returns [List<? extends SrcOp> omos]
  : ^( blk=BLOCK (^(OPTIONS .+))?
  {List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();}
   ( alternative {alts.add($alternative.altCodeBlock);} )+
  )
  {
  if ( alts.size()==1 && ebnfRoot==null) return alts;
  if ( ebnfRoot==null ) {
     $omos = DefaultOutputModelFactory.list(controller.getChoiceBlock((BlockAST)$blk, alts, $label));
  }
```

```
  else {
      Choice choice = controller.getEBNFBlock($ebnfRoot, alts);
      hasLookaheadBlock |= choice instanceof PlusBlock || choice instanceof StarBlock;
    $omos = DefaultOutputModelFactory.list(choice);
  }
  }
  ;


alternative returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
  boolean outerMost = inContext("RULE BLOCK");
}
@after {
  controller.finishAlternative($altCodeBlock, $ops, outerMost);
}
  : a=alt[outerMost] {$altCodeBlock=$a.altCodeBlock; $ops=$a.ops;}
;


alt[boolean outerMost] returns [CodeBlockForAlt altCodeBlock, List<SrcOp> ops]
@init {
// set alt if outer ALT only (the only ones with alt field set to Alternative object)
 AltAST altAST = (AltAST)retval.start;
 if ( outerMost ) controller.setCurrentOuterMostAlt(altAST.alt);
}
 : {
 List<SrcOp> elems = new ArrayList<SrcOp>();
 // TODO: shouldn't we pass $start to controller.alternative()?
 $altCodeBlock = controller.alternative(controller.getCurrentOuterMostAlt(), outerMost);
 $altCodeBlock.ops = $ops = elems;
 controller.setCurrentBlock($altCodeBlock);
 }
 ^( ALT elementOptions? ( element {if ($element.omos!=null) elems.addAll($element.omos);} )+ )

 | ^(ALT elementOptions? EPSILON)
     {$altCodeBlock = controller.epsilon(controller.getCurrentOuterMostAlt(), outerMost);}
 ;


element returns [List<? extends SrcOp> omos]
 : labeledElement     {$omos = $labeledElement.omos;}
 | atom[null,false]   {$omos = $atom.omos;}
 | subrule       {$omos = $subrule.omos;}
 |  ACTION       {$omos = controller.action((ActionAST)$ACTION);}
 |  SEMPRED       {$omos = controller.sempred((ActionAST)$SEMPRED);}
 |^(ACTION elementOptions)  {$omos = controller.action((ActionAST)$ACTION);}
 |  ^(SEMPRED elementOptions)  {$omos = controller.sempred((ActionAST)$SEMPRED);}
 ;


labeledElement returns [List<? extends SrcOp> omos]
```

```
    : ^(ASSIGN ID atom[$ID,false] )   {$omos = $atom.omos;}
    | ^(PLUS_ASSIGN ID atom[$ID,false])  {$omos = $atom.omos;}
    | ^(ASSIGN ID block[$ID,null] )   {$omos = $block.omos;}
    | ^(PLUS_ASSIGN ID block[$ID,null])  {$omos = $block.omos;}
    ;

subrule returns [List<? extends SrcOp> omos]
    : ^(OPTIONAL b=block[null,$OPTIONAL])
    {
    $omos = $block.omos;
    }
    | ( ^(op=CLOSURE b=block[null,null])
    | ^(op=POSITIVE_CLOSURE b=block[null,null])
    )
    {
    List<CodeBlockForAlt> alts = new ArrayList<CodeBlockForAlt>();
    SrcOp blk = $b.omos.get(0);
    CodeBlockForAlt alt = new CodeBlockForAlt(controller.delegate);
    alt.addOp(blk);
    alts.add(alt);
    SrcOp loop = controller.getEBNFBlock($op, alts); // "star it"
        hasLookaheadBlock |= loop instanceof PlusBlock || loop instanceof StarBlock;
        $omos = DefaultOutputModelFactory.list(loop);
    }
    | block[null, null]    {$omos = $block.omos;}
    ;

blockSet[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
    : ^(SET atom[label,invert]+) {$omos = controller.set($SET, $label, invert);}
    ;

/*
setElement
    : STRING_LITERAL
    | TOKEN_REF
    | ^(RANGE STRING_LITERAL STRING_LITERAL)
    ;
*/

// TODO: combine ROOT/BANG into one then just make new op ref'ing return value of atom/terminal...
// TODO: same for NOT
atom[GrammarAST label, boolean invert] returns [List<SrcOp> omos]
    : ^(NOT a=atom[$label, true])  {$omos = $a.omos;}
    | range[label]      {$omos = $range.omos;}
    | ^(DOT ID terminal[$label])
    | ^(DOT ID ruleref[$label])
    | ^(WILDCARD .)      {$omos = controller.wildcard($WILDCARD, $label);}
    | WILDCARD        {$omos = controller.wildcard($WILDCARD, $label);}
```

```
  |   terminal[label]      {$omos = $terminal.omos;}
  |   ruleref[label]      {$omos = $ruleref.omos;}
 | blockSet[$label, invert]  {$omos = $blockSet.omos;}
 ;

ruleref[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RULE_REF ARG_ACTION? elementOptions?)  {$omos = controller.ruleRef($RULE_REF, $label,
$ARG_ACTION);}
  ;

range[GrammarAST label] returns [List<SrcOp> omos]
  : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  ;

terminal[GrammarAST label] returns [List<SrcOp> omos]
  : ^(STRING_LITERAL .)   {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | STRING_LITERAL    {$omos = controller.stringRef($STRING_LITERAL, $label);}
  | ^(TOKEN_REF ARG_ACTION .) {$omos = controller.tokenRef($TOKEN_REF, $label, $ARG_ACTION);}
  | ^(TOKEN_REF .)    {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  | TOKEN_REF    {$omos = controller.tokenRef($TOKEN_REF, $label, null);}
  ;

elementOptions
  : ^(ELEMENT_OPTIONS elementOption+)
  ;

elementOption
  : ID
  |  ^(ASSIGN ID ID)
  |  ^(ASSIGN ID STRING_LITERAL)
  |  ^(ASSIGN ID ACTION)
  |  ^(ASSIGN ID INT)
  ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/codegen/SourceGenTriggers.g
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Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/META-
INF/maven/org.antlr/antlr4/pom.xml
No license file was found, but licenses were detected in source scan.

/*
* [The "BSD license"]

/** ANTLR tool checks output templates are compatible with tool code generation.
* For now, a simple string match used on x.y of x.y.z scheme.
* Must match Tool.VERSION during load to templates.
*
* REQUIRED.
*/

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>

```
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

    <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx):
    pass


# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx):
    pass

}; separator="\n">

>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

    <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx):
    return self.visitChildren(ctx)

}; separator="\n">
```

```
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>


Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
else:
    from <superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | u<t>}; null="u\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>

    <parser:(ctor)()>

    <namedActions.members>
```

```
    <funcs; separator="\n">


<if(sempredFuncs)>
   def sempred(self, localctx, ruleIndex, predIndex):
      if self._predicates == None:
         self._predicates = dict()
<parser.sempredFuncs.values:{f |
      self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
      pred = self._predicates.get(ruleIndex, None)
      if pred is None:
         raise Exception("No predicate with index:" + str(ruleIndex))
      else:
         return pred(localctx, predIndex)

   <sempredFuncs.values; separator="\n">
<endif>



   >>

   dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx, ruleIndex, actionIndex):
   if self._actions is None:
      actions = dict()
<recog.actionFuncs.values:{f|
      actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
      self._actions = actions
   action = self._actions.get(ruleIndex, None)
   if action is not None:
      action(localctx, actionIndex)
   else:
      raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx, ruleIndex, predIndex):
   if self._predicates is None:
      preds = dict()
<recog.sempredFuncs.values:{f|
      preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
      self._predicates = preds
   pred = self._predicates.get(ruleIndex, None)
```

```
    if pred is not None:
        return pred(localctx, predIndex)
    else:
        raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
def __init__(self, input, output=sys.stdout):
    super(<parser.name>, self).__init__(input, output=output)
    self.checkVersion("<file.ANTLRVersion>")
    self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
    self._predicates = None


>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx , actionIndex):
<actions:{index|
<if(first(actions))>
    if actionIndex == <index>:
        <actions.(index)>
<elseif(rest(actions))>
    elif actionIndex == <index>:
        <actions.(index)>
<endif> }; separator="\n">
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx, predIndex):
    <actions:{index|
<if(first(actions))>
    if predIndex == <index>:
        return <actions.(index)>
<elseif(rest(actions))>
    elif predIndex == <index>:
        return <actions.(index)>
<endif> }; separator="\n">
```

```
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name>}>):

    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
    self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
    <namedActions.init>
    <locals; separator="\n">
    try:
        <code>
        <postamble; separator="\n">
        <namedActions.after>
    <if(exceptions)>
    <exceptions; separator="\n">
    <else>
    except RecognitionException as re:
        localctx.exception = re
        self._errHandler.reportError(self, re)
        self._errHandler.recover(self, re)
    <endif>
    finally:
        <finallyAction>
        self.exitRule()
    return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p=0<if(currentRule.args)>, <args:{a | , <a>}><endif>):
    _parentctx = self._ctx
    _parentState = self.state
    localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
    _prevctx = localctx
    _startState = <currentRule.startState>
    self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
```

```
   <namedActions.init>
   <locals; separator="\n">
   try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
   except RecognitionException as re:
      localctx.exception = re
      self._errHandler.reportError(self, re)
      self._errHandler.recover(self, re)
   finally:
      <finallyAction>
      self.unrollRecursionContexts(_parentctx)
   return localctx

>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>

LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
```

```
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  pass
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
  <alts; separator="\n">
  self.state = <choice.stateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  <iteration>
  if not (<loopExpr>):
    break

>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
```

```
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
   <alt>
   pass
}; separator="\nel">

>>


OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">

>>


StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   if _alt==1<if(!choice.ast.greedy)>+1<endif>:
      <iteration>
      <alts> <! should only be one !>
   self.state = <choice.loopBackStateNumber>
   self._errHandler.sync(self)
   _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>


PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
   <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
   <alt>
}; separator="\nel">
   else:
      <error>
```

```
  self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)


>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" or ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})>) and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>


cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>
```

```
InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>


MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |    <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
    self._errHandler.reportMatch(self)
    self.consume()
>>


Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>


// ACTION STUFF


Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
    from antlr4.error.Errors import FailedPredicateException
    raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
```

```
    <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()    ::= "skip()"
LexerMoreCommand()    ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type())"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop))"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r)  ::= "localctx.stop"
ThisRulePropertyRef_text(r)  ::= "self._input.getText(localctx.start, self._input.LT(-1))"
```

ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)   ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<
def <t.name>(self, i=None):
  if i is None:
    return self.getTokens(<parser.name>.<t.name>)
  else:
    return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)   ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i=None):

```
    if i is None:
      return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
    else:
      return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 *  r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)     ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent=None, invokingState=-1<struct.ctorAttrs:{a | , <a.name>=None}>):
    super(<parser.name>.<struct.name>, self).__init__(parent, invokingState)
    self.parser = parser
    <attrs:{a | <a>}; separator="\n">
    <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

  <getters:{g | <g>}; separator="\n\n">

  def getRuleIndex(self):
    return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx):
    super(<parser.name>.<struct.name>, self).copyFrom(ctx)
    <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
  <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
```

```
class <struct.name>(<currentRule.name; format="cap">Context):

    def __init__(self, parser, ctx): # actually a <parser.name>.<currentRule.name; format="cap">Context)
        super(<parser.name>.<struct.name>, self).__init__(parser)
        <attrs:{a | <a>}; separator="\n">
        self.copyFrom(ctx)

    <getters:{g | <g>}; separator="\n">

    <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener):
    if hasattr(listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">"):
        listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor):
    if hasattr(visitor, "visit<struct.derivedFromName; format="cap">"):
        return visitor.visit<struct.derivedFromName; format="cap">(self)
    else:
        return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()              ::= "self._ctx.stop = self._input.LT(-1)"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>
```

```
recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>


recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
    self.triggerExitRuleEvent()
_prevctx = localctx
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
# encoding: utf-8
from __future__ import print_function
from antlr4 import *
from io import StringIO
import sys

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
else:
    from <superClass> import <superClass>

<endif>
```

```
<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
    <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
    <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
    <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

    channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

    modeNames = [ <lexer.modes:{m| u"<m>"}; separator=", ", wrap, anchor> ]

    literalNames = [ u"<INVALID>",
            <lexer.literalNames:{t | u<t>}; separator=", ", wrap, anchor> ]

    symbolicNames = [ u"<INVALID>",
            <lexer.symbolicNames:{t | u<t>}; separator=", ", wrap, anchor> ]

    ruleNames = [ <lexer.ruleNames:{r | u"<r>"}; separator=", ", wrap, anchor> ]

    grammarFileName = u"<lexer.grammarFileName>"

    def __init__(self, input=None, output=sys.stdout):
        super(<lexer.name>, self).__init__(input, output=output)
        self.checkVersion("<lexerFile.ANTLRVersion>")
        self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
        self._actions = None
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>

>>

SerializedATN(model) ::= <<
```

<! only one segment, can be inlined !>

```
def serializedATN():
    with StringIO() as buf:
        buf.write(u"<model.serialized; wrap={")<\n>     buf.write(u"}>")
        return buf.getvalue()
```

>>

```
/** Using a type to init value map, try to init a type; if not in table
 *  must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>
```

codeFileExtension() ::= ".py"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/Python2/Python2.stg
No license file was found, but licenses were detected in source scan.

```
 *  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** The definitive ANTLR v3 tree grammar to walk/visit ANTLR v4 grammars.
 *  Parses trees created by ANTLRParser.g.
 *
 *  Rather than have multiple tree grammars, one for each visit, I'm
 *  creating this generic visitor that knows about context. All of the
 *  boilerplate pattern recognition is done here. Then, subclasses can
 *  override the methods they care about. This prevents a lot of the same
 *  context tracking stuff like "set current alternative for current
 *  rule node" that is repeated in lots of tree filters.
 */
tree grammar GrammarTreeVisitor;
options {
 language     = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
}

// Include the copyright in this source and also the generated source
@header {
/*
[The "BSD license"]
Copyright (c) 2011 Terence Parr
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DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
```

```
package org.antlr.v4.parse;
import org.antlr.v4.Tool;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import java.lang.reflect.InvocationTargetException;
import java.lang.reflect.Method;
}

@members {
public String grammarName;
public GrammarAST currentRuleAST;
public String currentModeName = LexerGrammar.DEFAULT_MODE_NAME;
public String currentRuleName;
public GrammarAST currentOuterAltRoot;
public int currentOuterAltNumber = 1; // 1..n
public int rewriteEBNFLevel = 0;

public GrammarTreeVisitor() { this(null); }

// Should be abstract but can't make gen'd parser abstract;
// subclasses should implement else everything goes to stderr!
public ErrorManager getErrorManager() { return null; }

public void visitGrammar(GrammarAST t) { visit(t, "grammarSpec"); }
public void visit(GrammarAST t, String ruleName) {
 CommonTreeNodeStream nodes = new CommonTreeNodeStream(new GrammarASTAdaptor(), t);
 setTreeNodeStream(nodes);
 try {
 Method m = getClass().getMethod(ruleName);
 m.invoke(this);
 }
 catch (Throwable e) {
 ErrorManager errMgr = getErrorManager();
 if ( e instanceof InvocationTargetException ) {
 e = e.getCause();
 }
 //e.printStackTrace(System.err);
 if ( errMgr==null ) {
 System.err.println("can't find rule "+ruleName+
      " or tree structure error: "+t.toStringTree()
      );
 e.printStackTrace(System.err);
 }
 else errMgr.toolError(ErrorType.INTERNAL_ERROR, e);
```

```
    }
}

public void discoverGrammar(GrammarRootAST root, GrammarAST ID) { }
public void finishPrequels(GrammarAST firstPrequel) { }
public void finishGrammar(GrammarRootAST root, GrammarAST ID) { }

public void grammarOption(GrammarAST ID, GrammarAST valueAST) { }
public void ruleOption(GrammarAST ID, GrammarAST valueAST) { }
public void blockOption(GrammarAST ID, GrammarAST valueAST) { }
public void defineToken(GrammarAST ID) { }
public void defineChannel(GrammarAST ID) { }
public void globalNamedAction(GrammarAST scope, GrammarAST ID, ActionAST action) { }
public void importGrammar(GrammarAST label, GrammarAST ID) { }

public void modeDef(GrammarAST m, GrammarAST ID) { }

public void discoverRules(GrammarAST rules) { }
public void finishRules(GrammarAST rule) { }
public void discoverRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
    ActionAST arg, ActionAST returns, GrammarAST thrws,
    GrammarAST options, ActionAST locals,
    List<GrammarAST> actions,
    GrammarAST block) { }
public void finishRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void discoverLexerRule(RuleAST rule, GrammarAST ID, List<GrammarAST> modifiers,
                GrammarAST block) { }
public void finishLexerRule(RuleAST rule, GrammarAST ID, GrammarAST block) { }
public void ruleCatch(GrammarAST arg, ActionAST action) { }
public void finallyAction(ActionAST action) { }
public void discoverOuterAlt(AltAST alt) { }
public void finishOuterAlt(AltAST alt) { }
public void discoverAlt(AltAST alt) { }
public void finishAlt(AltAST alt) { }

public void ruleRef(GrammarAST ref, ActionAST arg) { }
public void tokenRef(TerminalAST ref) { }
public void elementOption(GrammarASTWithOptions t, GrammarAST ID, GrammarAST valueAST) { }
public void stringRef(TerminalAST ref) { }
public void wildcardRef(GrammarAST ref) { }
public void actionInAlt(ActionAST action) { }
public void sempredInAlt(PredAST pred) { }
public void label(GrammarAST op, GrammarAST ID, GrammarAST element) { }
public void lexerCallCommand(int outerAltNumber, GrammarAST ID, GrammarAST arg) { }
public void lexerCommand(int outerAltNumber, GrammarAST ID) { }

protected void enterGrammarSpec(GrammarAST tree) { }
protected void exitGrammarSpec(GrammarAST tree) { }
```

```
protected void enterPrequelConstructs(GrammarAST tree) { }
protected void exitPrequelConstructs(GrammarAST tree) { }

protected void enterPrequelConstruct(GrammarAST tree) { }
protected void exitPrequelConstruct(GrammarAST tree) { }

protected void enterOptionsSpec(GrammarAST tree) { }
protected void exitOptionsSpec(GrammarAST tree) { }

protected void enterOption(GrammarAST tree) { }
protected void exitOption(GrammarAST tree) { }

protected void enterOptionValue(GrammarAST tree) { }
protected void exitOptionValue(GrammarAST tree) { }

protected void enterDelegateGrammars(GrammarAST tree) { }
protected void exitDelegateGrammars(GrammarAST tree) { }

protected void enterDelegateGrammar(GrammarAST tree) { }
protected void exitDelegateGrammar(GrammarAST tree) { }

protected void enterTokensSpec(GrammarAST tree) { }
protected void exitTokensSpec(GrammarAST tree) { }

protected void enterTokenSpec(GrammarAST tree) { }
protected void exitTokenSpec(GrammarAST tree) { }

protected void enterChannelsSpec(GrammarAST tree) { }
protected void exitChannelsSpec(GrammarAST tree) { }

protected void enterChannelSpec(GrammarAST tree) { }
protected void exitChannelSpec(GrammarAST tree) { }

protected void enterAction(GrammarAST tree) { }
protected void exitAction(GrammarAST tree) { }

protected void enterRules(GrammarAST tree) { }
protected void exitRules(GrammarAST tree) { }

protected void enterMode(GrammarAST tree) { }
protected void exitMode(GrammarAST tree) { }

protected void enterLexerRule(GrammarAST tree) { }
protected void exitLexerRule(GrammarAST tree) { }

protected void enterRule(GrammarAST tree) { }
protected void exitRule(GrammarAST tree) { }
```

```java
protected void enterExceptionGroup(GrammarAST tree) { }
protected void exitExceptionGroup(GrammarAST tree) { }

protected void enterExceptionHandler(GrammarAST tree) { }
protected void exitExceptionHandler(GrammarAST tree) { }

protected void enterFinallyClause(GrammarAST tree) { }
protected void exitFinallyClause(GrammarAST tree) { }

protected void enterLocals(GrammarAST tree) { }
protected void exitLocals(GrammarAST tree) { }

protected void enterRuleReturns(GrammarAST tree) { }
protected void exitRuleReturns(GrammarAST tree) { }

protected void enterThrowsSpec(GrammarAST tree) { }
protected void exitThrowsSpec(GrammarAST tree) { }

protected void enterRuleAction(GrammarAST tree) { }
protected void exitRuleAction(GrammarAST tree) { }

protected void enterRuleModifier(GrammarAST tree) { }
protected void exitRuleModifier(GrammarAST tree) { }

protected void enterLexerRuleBlock(GrammarAST tree) { }
protected void exitLexerRuleBlock(GrammarAST tree) { }

protected void enterRuleBlock(GrammarAST tree) { }
protected void exitRuleBlock(GrammarAST tree) { }

protected void enterLexerOuterAlternative(AltAST tree) { }
protected void exitLexerOuterAlternative(AltAST tree) { }

protected void enterOuterAlternative(AltAST tree) { }
protected void exitOuterAlternative(AltAST tree) { }

protected void enterLexerAlternative(GrammarAST tree) { }
protected void exitLexerAlternative(GrammarAST tree) { }

protected void enterLexerElements(GrammarAST tree) { }
protected void exitLexerElements(GrammarAST tree) { }

protected void enterLexerElement(GrammarAST tree) { }
protected void exitLexerElement(GrammarAST tree) { }

protected void enterLabeledLexerElement(GrammarAST tree) { }
protected void exitLabeledLexerElement(GrammarAST tree) { }
```

```java
protected void enterLexerBlock(GrammarAST tree) { }
protected void exitLexerBlock(GrammarAST tree) { }

protected void enterLexerAtom(GrammarAST tree) { }
protected void exitLexerAtom(GrammarAST tree) { }

protected void enterActionElement(GrammarAST tree) { }
protected void exitActionElement(GrammarAST tree) { }

protected void enterAlternative(AltAST tree) { }
protected void exitAlternative(AltAST tree) { }

protected void enterLexerCommand(GrammarAST tree) { }
protected void exitLexerCommand(GrammarAST tree) { }

protected void enterLexerCommandExpr(GrammarAST tree) { }
protected void exitLexerCommandExpr(GrammarAST tree) { }

protected void enterElement(GrammarAST tree) { }
protected void exitElement(GrammarAST tree) { }

protected void enterAstOperand(GrammarAST tree) { }
protected void exitAstOperand(GrammarAST tree) { }

protected void enterLabeledElement(GrammarAST tree) { }
protected void exitLabeledElement(GrammarAST tree) { }

protected void enterSubrule(GrammarAST tree) { }
protected void exitSubrule(GrammarAST tree) { }

protected void enterLexerSubrule(GrammarAST tree) { }
protected void exitLexerSubrule(GrammarAST tree) { }

protected void enterBlockSuffix(GrammarAST tree) { }
protected void exitBlockSuffix(GrammarAST tree) { }

protected void enterEbnfSuffix(GrammarAST tree) { }
protected void exitEbnfSuffix(GrammarAST tree) { }

protected void enterAtom(GrammarAST tree) { }
protected void exitAtom(GrammarAST tree) { }

protected void enterBlockSet(GrammarAST tree) { }
protected void exitBlockSet(GrammarAST tree) { }

protected void enterSetElement(GrammarAST tree) { }
protected void exitSetElement(GrammarAST tree) { }
```

```
    protected void enterBlock(GrammarAST tree) { }
    protected void exitBlock(GrammarAST tree) { }

    protected void enterRuleref(GrammarAST tree) { }
    protected void exitRuleref(GrammarAST tree) { }

    protected void enterRange(GrammarAST tree) { }
    protected void exitRange(GrammarAST tree) { }

    protected void enterTerminal(GrammarAST tree) { }
    protected void exitTerminal(GrammarAST tree) { }

    protected void enterElementOptions(GrammarAST tree) { }
    protected void exitElementOptions(GrammarAST tree) { }

    protected void enterElementOption(GrammarAST tree) { }
    protected void exitElementOption(GrammarAST tree) { }

 @Override
 public void traceIn(String ruleName, int ruleIndex)  {
  System.err.println("enter "+ruleName+": "+input.LT(1));
 }

 @Override
 public void traceOut(String ruleName, int ruleIndex)  {
  System.err.println("exit "+ruleName+": "+input.LT(1));
 }
}

grammarSpec
@init {
 enterGrammarSpec($start);
}
@after {
 exitGrammarSpec($start);
}
  :  ^( GRAMMAR ID {grammarName=$ID.text;}
    {discoverGrammar((GrammarRootAST)$GRAMMAR, $ID);}
     prequelConstructs
    {finishPrequels($prequelConstructs.firstOne);}
     rules mode*
    {finishGrammar((GrammarRootAST)$GRAMMAR, $ID);}
   )
;

prequelConstructs returns [GrammarAST firstOne=null]
@init {
```

```
enterPrequelConstructs($start);
}
@after {
exitPrequelConstructs($start);
}
: {$firstOne=$start;} prequelConstruct+
|
;

prequelConstruct
@init {
enterPrequelConstructs($start);
}
@after {
exitPrequelConstructs($start);
}
:   optionsSpec
  |  delegateGrammars
  |  tokensSpec
  |  channelsSpec
  |  action
  ;

optionsSpec
@init {
enterOptionsSpec($start);
}
@after {
exitOptionsSpec($start);
}
: ^(OPTIONS option*)
  ;

option
@init {
enterOption($start);
boolean rule = inContext("RULE ...");
boolean block = inContext("BLOCK ...");
}
@after {
exitOption($start);
}
  :  ^(a=ASSIGN ID v=optionValue)
   {
   if ( block ) blockOption($ID, $v.start); // most specific first
   else if ( rule ) ruleOption($ID, $v.start);
   else grammarOption($ID, $v.start);
   }
```

```
                ;

optionValue returns [String v]
@init {
 enterOptionValue($start);
 $v = $start.token.getText();
}
@after {
 exitOptionValue($start);
}
  :  ID
  |  STRING_LITERAL
  |  INT
  ;

delegateGrammars
@init {
 enterDelegateGrammars($start);
}
@after {
 exitDelegateGrammars($start);
}
 :  ^(IMPORT delegateGrammar+)
 ;

delegateGrammar
@init {
 enterDelegateGrammar($start);
}
@after {
 exitDelegateGrammar($start);
}
  :  ^(ASSIGN label=ID id=ID) {importGrammar($label, $id);}
  |  id=ID      {importGrammar(null, $id);}
  ;

tokensSpec
@init {
 enterTokensSpec($start);
}
@after {
 exitTokensSpec($start);
}
 :  ^(TOKENS_SPEC tokenSpec+)
 ;

tokenSpec
@init {
```

```
enterTokenSpec($start);
}
@after {
exitTokenSpec($start);
}
: ID     {defineToken($ID);}
;

channelsSpec
@init {
enterChannelsSpec($start);
}
@after {
exitChannelsSpec($start);
}
:  ^(CHANNELS channelSpec+)
;

channelSpec
@init {
enterChannelSpec($start);
}
@after {
exitChannelSpec($start);
}
: ID     {defineChannel($ID);}
;

action
@init {
enterAction($start);
}
@after {
exitAction($start);
}
: ^(AT sc=ID? name=ID ACTION) {globalNamedAction($sc, $name, (ActionAST)$ACTION);}
;

rules
@init {
enterRules($start);
}
@after {
exitRules($start);
}
  : ^(RULES {discoverRules($RULES);} (rule|lexerRule)* {finishRules($RULES);})
  ;
```

```
mode
@init {
enterMode($start);
}
@after {
exitMode($start);
}
: ^( MODE ID {currentModeName=$ID.text; modeDef($MODE, $ID);} lexerRule* )
;

lexerRule
@init {
enterLexerRule($start);
List<GrammarAST> mods = new ArrayList<GrammarAST>();
currentOuterAltNumber=0;
}
@after {
exitLexerRule($start);
}
: ^( RULE TOKEN_REF
  {currentRuleName=$TOKEN_REF.text; currentRuleAST=$RULE;}
  (^(RULEMODIFIERS m=FRAGMENT {mods.add($m);}))?
    {discoverLexerRule((RuleAST)$RULE, $TOKEN_REF, mods, (GrammarAST)input.LT(1));}
    lexerRuleBlock
    {
    finishLexerRule((RuleAST)$RULE, $TOKEN_REF, $lexerRuleBlock.start);
    currentRuleName=null; currentRuleAST=null;
    }
    )
;

rule
@init {
enterRule($start);
List<GrammarAST> mods = new ArrayList<GrammarAST>();
List<GrammarAST> actions = new ArrayList<GrammarAST>(); // track roots
currentOuterAltNumber=0;
}
@after {
exitRule($start);
}
:  ^( RULE RULE_REF {currentRuleName=$RULE_REF.text; currentRuleAST=$RULE;}
  (^(RULEMODIFIERS (m=ruleModifier{mods.add($m.start);})+))?
  ARG_ACTION?
    ret=ruleReturns?
    thr=throwsSpec?
    loc=locals?
    ( opts=optionsSpec
```

```
    |   a=ruleAction {actions.add($a.start);}
    )*
    {discoverRule((RuleAST)$RULE, $RULE_REF, mods, (ActionAST)$ARG_ACTION,
        $ret.start!=null?(ActionAST)$ret.start.getChild(0):null,
        $thr.start, $opts.start,
        $loc.start!=null?(ActionAST)$loc.start.getChild(0):null,
        actions, (GrammarAST)input.LT(1));}
    ruleBlock exceptionGroup
    {finishRule((RuleAST)$RULE, $RULE_REF, $ruleBlock.start); currentRuleName=null; currentRuleAST=null;}
    )
  ;

exceptionGroup
@init {
 enterExceptionGroup($start);
}
@after {
 exitExceptionGroup($start);
}
  : exceptionHandler* finallyClause?
  ;

exceptionHandler
@init {
 enterExceptionHandler($start);
}
@after {
 exitExceptionHandler($start);
}
 : ^(CATCH ARG_ACTION ACTION) {ruleCatch($ARG_ACTION, (ActionAST)$ACTION);}
 ;

finallyClause
@init {
 enterFinallyClause($start);
}
@after {
 exitFinallyClause($start);
}
 : ^(FINALLY ACTION)    {finallyAction((ActionAST)$ACTION);}
 ;

locals
@init {
 enterLocals($start);
}
@after {
 exitLocals($start);
```

```
}
: ^(LOCALS ARG_ACTION)
;

ruleReturns
@init {
enterRuleReturns($start);
}
@after {
exitRuleReturns($start);
}
: ^(RETURNS ARG_ACTION)
;

throwsSpec
@init {
enterThrowsSpec($start);
}
@after {
exitThrowsSpec($start);
}
  : ^(THROWS ID+)
  ;

ruleAction
@init {
enterRuleAction($start);
}
@after {
exitRuleAction($start);
}
: ^(AT ID ACTION)
;

ruleModifier
@init {
enterRuleModifier($start);
}
@after {
exitRuleModifier($start);
}
  : PUBLIC
  | PRIVATE
  | PROTECTED
  | FRAGMENT
  ;

lexerRuleBlock
```

```
@init {
enterLexerRuleBlock($start);
}
@after {
exitLexerRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    lexerOuterAlternative
   )+
   )
  ;


ruleBlock
@init {
enterRuleBlock($start);
}
@after {
exitRuleBlock($start);
}
  : ^( BLOCK
   ( {
    currentOuterAltRoot = (GrammarAST)input.LT(1);
   currentOuterAltNumber++;
   }
    outerAlternative
   )+
   )
  ;


lexerOuterAlternative
@init {
enterLexerOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
@after {
finishOuterAlt((AltAST)$start);
exitLexerOuterAlternative((AltAST)$start);
}
 : lexerAlternative
 ;


outerAlternative
@init {
```

```
enterOuterAlternative((AltAST)$start);
discoverOuterAlt((AltAST)$start);
}
@after {
finishOuterAlt((AltAST)$start);
exitOuterAlternative((AltAST)$start);
}
: alternative
;

lexerAlternative
@init {
enterLexerAlternative($start);
}
@after {
exitLexerAlternative($start);
}
: ^(LEXER_ALT_ACTION lexerElements lexerCommand+)
  | lexerElements
  ;

lexerElements
@init {
enterLexerElements($start);
}
@after {
exitLexerElements($start);
}
  : ^(ALT lexerElement+)
  ;

lexerElement
@init {
enterLexerElement($start);
}
@after {
exitLexerElement($start);
}
: labeledLexerElement
| lexerAtom
| lexerSubrule
|  ACTION      {actionInAlt((ActionAST)$ACTION);}
|  SEMPRED     {sempredInAlt((PredAST)$SEMPRED);}
|  ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|  ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
| EPSILON
;
```

```
labeledLexerElement
@init {
 enterLabeledLexerElement($start);
}
@after {
 exitLabeledLexerElement($start);
}
  :  ^((ASSIGN|PLUS_ASSIGN) ID (lexerAtom|block))
 ;

lexerBlock
@init {
 enterLexerBlock($start);
}
@after {
 exitLexerBlock($start);
}
 : ^(BLOCK optionsSpec? lexerAlternative+)
  ;

lexerAtom
@init {
 enterLexerAtom($start);
}
@after {
 exitLexerAtom($start);
}
  :  terminal
  |  ^(NOT blockSet)
  |  blockSet
  |  ^(WILDCARD elementOptions)
  |  WILDCARD
  | LEXER_CHAR_SET
  |  range
  |  ruleref
  ;

actionElement
@init {
 enterActionElement($start);
}
@after {
 exitActionElement($start);
}
 : ACTION
 |  ^(ACTION elementOptions)
 |  SEMPRED
 |  ^(SEMPRED elementOptions)
```

```
;

alternative
@init {
enterAlternative((AltAST)$start);
discoverAlt((AltAST)$start);
}
@after {
finishAlt((AltAST)$start);
exitAlternative((AltAST)$start);
}
: ^(ALT elementOptions? element+)
| ^(ALT elementOptions? EPSILON)
  ;

lexerCommand
@init {
enterLexerCommand($start);
}
@after {
exitLexerCommand($start);
}
: ^(LEXER_ACTION_CALL ID lexerCommandExpr)
    {lexerCallCommand(currentOuterAltNumber, $ID, $lexerCommandExpr.start);}
| ID
    {lexerCommand(currentOuterAltNumber, $ID);}
;

lexerCommandExpr
@init {
enterLexerCommandExpr($start);
}
@after {
exitLexerCommandExpr($start);
}
: ID
| INT
;

element
@init {
enterElement($start);
}
@after {
exitElement($start);
}
: labeledElement
| atom
```

```
| subrule
|   ACTION     {actionInAlt((ActionAST)$ACTION);}
|   SEMPRED    {sempredInAlt((PredAST)$SEMPRED);}
|   ^(ACTION elementOptions) {actionInAlt((ActionAST)$ACTION);}
|   ^(SEMPRED elementOptions) {sempredInAlt((PredAST)$SEMPRED);}
| range
| ^(NOT blockSet)
| ^(NOT block)
;

astOperand
@init {
enterAstOperand($start);
}
@after {
exitAstOperand($start);
}
: atom
| ^(NOT blockSet)
| ^(NOT block)
;

labeledElement
@init {
enterLabeledElement($start);
}
@after {
exitLabeledElement($start);
}
: ^((ASSIGN|PLUS_ASSIGN) ID element) {label($start, $ID, $element.start);}
;

subrule
@init {
enterSubrule($start);
}
@after {
exitSubrule($start);
}
: ^(blockSuffix block)
| block
  ;

lexerSubrule
@init {
enterLexerSubrule($start);
}
@after {
```

```
 exitLexerSubrule($start);
}
 : ^(blockSuffix lexerBlock)
| lexerBlock
  ;

blockSuffix
@init {
 enterBlockSuffix($start);
}
@after {
 exitBlockSuffix($start);
}
  : ebnfSuffix
  ;

ebnfSuffix
@init {
 enterEbnfSuffix($start);
}
@after {
 exitEbnfSuffix($start);
}
 : OPTIONAL
 | CLOSURE
  | POSITIVE_CLOSURE
;

atom
@init {
 enterAtom($start);
}
@after {
 exitAtom($start);
}
 : ^(DOT ID terminal)
| ^(DOT ID ruleref)
  | ^(WILDCARD elementOptions) {wildcardRef($WILDCARD);}
  | WILDCARD     {wildcardRef($WILDCARD);}
  |  terminal
  | blockSet
  |  ruleref
  ;

blockSet
@init {
 enterBlockSet($start);
}
```

```
@after {
exitBlockSet($start);
}
: ^(SET setElement+)
;

setElement
@init {
enterSetElement($start);
}
@after {
exitSetElement($start);
}
: ^(STRING_LITERAL elementOptions)    {stringRef((TerminalAST)$STRING_LITERAL);}
| ^(TOKEN_REF elementOptions)   {tokenRef((TerminalAST)$TOKEN_REF);}
| STRING_LITERAL              {stringRef((TerminalAST)$STRING_LITERAL);}
| TOKEN_REF                {tokenRef((TerminalAST)$TOKEN_REF);}
| ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
 {
 stringRef((TerminalAST)$a);
 stringRef((TerminalAST)$b);
 }
    |    LEXER_CHAR_SET
;

block
@init {
enterBlock($start);
}
@after {
exitBlock($start);
}
 : ^(BLOCK optionsSpec? ruleAction* ACTION? alternative+)
 ;

ruleref
@init {
enterRuleref($start);
}
@after {
exitRuleref($start);
}
 : ^(RULE_REF arg=ARG_ACTION? elementOptions?)
 {
 ruleRef($RULE_REF, (ActionAST)$ARG_ACTION);
 if ( $arg!=null ) actionInAlt((ActionAST)$arg);
 }
 ;
```

```
range
@init {
enterRange($start);
}
@after {
exitRange($start);
}
  : ^(RANGE STRING_LITERAL STRING_LITERAL)
  ;


terminal
@init {
enterTerminal($start);
}
@after {
exitTerminal($start);
}
  : ^(STRING_LITERAL elementOptions)
      {stringRef((TerminalAST)$STRING_LITERAL);}
  | STRING_LITERAL   {stringRef((TerminalAST)$STRING_LITERAL);}
  | ^(TOKEN_REF elementOptions) {tokenRef((TerminalAST)$TOKEN_REF);}
  | TOKEN_REF       {tokenRef((TerminalAST)$TOKEN_REF);}
  ;


elementOptions
@init {
enterElementOptions($start);
}
@after {
exitElementOptions($start);
}
  : ^(ELEMENT_OPTIONS elementOption[(GrammarASTWithOptions)$start.getParent()]*)
  ;


elementOption[GrammarASTWithOptions t]
@init {
enterElementOption($start);
}
@after {
exitElementOption($start);
}
  : ID       {elementOption(t, $ID, null);}
  |  ^(ASSIGN id=ID v=ID)   {elementOption(t, $id, $v);}
  |  ^(ASSIGN ID v=STRING_LITERAL) {elementOption(t, $ID, $v);}
  |  ^(ASSIGN ID v=ACTION)   {elementOption(t, $ID, $v);}
  |  ^(ASSIGN ID v=INT)    {elementOption(t, $ID, $v);}
  ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/parse/GrammarTreeVisitor.g
No license file was found, but licenses were detected in source scan.

```
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 */


/** How to generate rules derived from left-recursive rules.
 *  These rely on recRuleAltPredicate(),
 *  recRuleArg(), recRuleSetResultAction(), recRuleSetReturnAction()
 *  templates in main language.stg
 */
group LeftRecursiveRules;

recRule(ruleName, argName, primaryAlts, opAlts, setResultAction,
        userRetvals, leftRecursiveRuleRefLabels) ::=
<<
<ruleName><if(userRetvals)> returns [<userRetvals>]<endif>
  :   ( {} <primaryAlts:{alt | <alt.altText> }; separator="\n       | ">
```

```
    )
    (
      <opAlts; separator="\n      | ">
    )*
  ;
>>


recRuleAlt(alt, precOption, opPrec, pred) ::= <<
{<pred>}?\<<precOption>=<opPrec>\> <alt.altText>
>>


Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/LeftRecursiveRules.stg
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 */

// File     : A3Lexer.g
// Author   : Jim Idle (jimi@temporal-wave.com)
```

// Copyright : Free BSD - See @header clause below
// Version   : First implemented as part of ANTLR 3.2 this is the self
//   hosting ANTLR 3 Lexer.
//
// Description
// -----------
// This is the definitive lexer grammar for parsing ANTLR V3.x.x grammars. All other
// gramnmars are derived from this grammar via source code control integration (perforce)
// or by the gdiff tool.
//
// This grammar and its associated grmmmars A3Parser.g and A3Walker.g exhibit the following
// traits, which are recommended for all production quality grammars:
//
// 1) They are separate grammars, not composite grammars;
// 2) They implement all supporting methods in a superclass (at least this is recommended
//   for language targets that support inheritence;
// 3) All errors are pushed as far down the parsing chain as possible, which means
//   that the lexer tries to defer error reporting to the parser, and the parser
//   tries to defer error reporting to a semantic phase consisting of a single
//   walk of the AST. The reason for this is that the error messages produced
//   from later phases of the parse will generally have better context and so
//   be more useful to the end user. Consider the message: "Syntax error at 'options'"
//   vs: "You cannot specify two options{} sections in a single grammar file".
// 4) The lexer is 'programmed' to catch common mistakes such as unterminated literals
//   and report them specifically and not just issue confusing lexer mismatch errors.
//

/** Read in an ANTLR grammar and build an AST. Try not to do
 * any actions, just build the tree.
 *
 * The phases are:
 *
 * A3Lexer.g (this file)
 *   A3Parser.g
 *   A3Verify.g (derived from A3Walker.g)
 * assign.types.g
 * define.g
 * buildnfa.g
 * antlr.print.g (optional)
 * codegen.g
 *
 * Terence Parr
 * University of San Francisco
 * 2005
 * Jim Idle (this v3 grammar)
 * Temporal Wave LLC
 * 2009
 */

```
lexer grammar ANTLRLexer;

// ==============================================================================
// Note that while this grammar does not care about order of constructs
// that don't really matter, such as options before @header etc, it must first
// be parsed by the original v2 parser, before it replaces it. That parser does
// care about order of structures. Hence we are constrained by the v2 parser
// for at least the first bootstrap release that causes this parser to replace
// the v2 version.
// ==============================================================================

// -------
// Options
//
// V3 option directives to tell the tool what we are asking of it for this
// grammar.
//
options {

 // Target language is Java, which is the default but being specific
 // here as this grammar is also meant as a good example grammar for
 // for users.
 //
 language      = Java;

 // The super class that this lexer should expect to inherit from, and
 // which contains any and all support routines for the lexer. This is
 // commented out in this baseline (definitive or normative grammar)
 // - see the ANTLR tool implementation for hints on how to use the super
 //   class
 //
 //superclass    = AbstractA3Lexer;
}

tokens { SEMPRED; TOKEN_REF; RULE_REF; LEXER_CHAR_SET; ARG_ACTION; }

// Include the copyright in this source and also the generated source
//
@lexer::header {
/*
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```

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3. The name of the author may not be used to endorse or promote products
   derived from this software without specific prior written permission.

```
*/
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.runtime.misc.Interval;
}
```

```
@members {
public static final int COMMENTS_CHANNEL = 2;

  public CommonTokenStream tokens; // track stream we push to; need for context info
  public boolean isLexerRule = false;

public void grammarError(ErrorType etype, org.antlr.runtime.Token token, Object... args) { }

/** scan backwards from current point in this.tokens list
 *  looking for the start of the rule or subrule.
 *  Return token or null if for some reason we can't find the start.
 */
public Token getRuleOrSubruleStartToken() {
   if ( tokens==null ) return null;
int i = tokens.index();
   int n = tokens.size();
   if ( i>=n ) i = n-1; // seems index == n as we lex
while ( i>=0 && i<n ) {
 int ttype = tokens.get(i).getType();
 if ( ttype == LPAREN || ttype == TOKEN_REF || ttype == RULE_REF ) {
  return tokens.get(i);
 }
 i--;
 }
```

```
   return null;
 }
}


// --------
// Comments
//
// ANTLR comments can be multi or single line and we don't care
// which particularly. However we also accept Javadoc style comments
// of the form: /** ... */ and we do take care to distinguish those
// from ordinary multi-line comments
// Note how we guide the lexical PATH because we want to issue a decriptive
// error message in case of a standalone '/' character, which makes no
// sense in ANTLR source code. We alo trap unterminated multi-line comments
//
fragment DOC_COMMENT : ;
COMMENT
@init {

 // Record the start line and offsets as if we need to report an
 // unterminated comment, then we want to show the start of the comment
 // we think is broken, not the end, where people will have to try and work
 // it out themselves.
 //
 int startLine = $line;
 int offset    = getCharPositionInLine();
}
  : // Eat the first character only, then see if we have a comment
    // or something silly.
    //
    '/'  // Comment introducer

    (
       // Single line comment, possibly with embedded src/line directives
       // in a similar style to the C pre-processor, allowing generated
       // code to refer the programmer back to the original source code
       // in case of error.
       //
       '/'
        (
           (' $ANTLR')=> ' $ANTLR' SRC
          | ~(NLCHARS)*
        )

     | // Multi-line comment, which may be a documentation comment
        // if it starts /** (note that we protect against accidentaly
        // recognizing a comment /**/ as a documentation comment
        //
```

```
'*' (
    { input.LA(2) != '/'}?=> '*' { $type = DOC_COMMENT; }
  | { true }?=> // Required to cover all alts with predicates
    )

    // Should we support embedded multiline comments here?
    //
    (
        // Pick out end of multiline comment and exit the loop
        // if we find it.
        //
        {    !(input.LA(1) == '*' && input.LA(2) == '/') }?

            // Anything else other than the non-greedy match of
            // the comment close sequence
            //
            .
    )*
(
        // Look for the comment terminator, but if it is accidentally
        // unterminated, then we will hit EOF, which will trigger the
        // epsilon alt and hence we can issue an error message relative
        // to the start of the unterminated multi-line comment
        //
        '*/'

    | // Unterminated comment!
        //
        {
          // ErrorManager.msg(Msg.UNTERMINATED_DOC_COMMENT, startLine, offset, $pos, startLine,
offset, $pos, (Object)null);
        }
    )

| // There was nothing that made sense following the opening '/' and so
    // we issue an error regarding the malformed comment
    //
    {
      // TODO: Insert error message relative to comment start
      //
    }
)
{
  // We do not wish to pass the comments in to the parser. If you are
  // writing a formatter then you will want to preserve the comments off
  // channel, but could just skip and save token space if not.
  //
  $channel=COMMENTS_CHANNEL;
```

```
    }
  ;

ARG_OR_CHARSET
options {k=1;}
  :  {isLexerRule}?=> LEXER_CHAR_SET {$type=LEXER_CHAR_SET;}
  |  {!isLexerRule}?=> ARG_ACTION
     {
     $type=ARG_ACTION;
     // Set the token text to our gathered string minus outer [ ]
     String t = $text;
     t = t.substring(1,t.length()-1);
     setText(t);
     }
  ;

fragment
LEXER_CHAR_SET
 : '['
 ( '\\' ~('\r'|'\n')
 | ~('\r'|'\n'|'\\'|']')
 )*
 ']'
 ;

// --------------
// Argument specs
//
// Certain argument lists, such as those specifying call parameters
// to a rule invocation, or input parameters to a rule specification
// are contained within square brackets. In the lexer we consume them
// all at once and sort them out later in the grammar analysis.
//
fragment
ARG_ACTION
 : '['
     (
        ARG_ACTION

      | ('"')=>ACTION_STRING_LITERAL

      | ('\'')=>ACTION_CHAR_LITERAL

      | ~('['|']')
     )*

     ']'
  ;
```

```
// -------
// Actions
//
// Other than making sure to distinguish between { and } embedded
// within what we have assumed to be literals in the action code, the
// job of the lexer is merely to gather the code within the action
// (delimited by {}) and pass it to the parser as a single token.
// We know that this token will be asked for its text somewhere
// in the upcoming parse, so setting the text here to exclude
// the delimiting {} is no additional overhead.
//
ACTION
 : NESTED_ACTION
  ( '?' {$type = SEMPRED;}
   ( (WSNLCHARS* '=>') => WSNLCHARS* '=>' // v3 gated sempred
    {
    Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_GATED_SEMPRED, t);
    }
   )?
  )?
 ;


// ----------------
// Action structure
//
// Many language targets use {} as block delimiters and so we
// must recursively match {} delimited blocks to balance the
// braces. Additionally, we must make some assumptions about
// literal string representation in the target language. We assume
// that they are delimited by ' or " and so consume these
// in their own alts so as not to inadvertantly match {}.
// This rule calls itself on matching a {
//
fragment
NESTED_ACTION
@init {

 // Record the start line and offsets as if we need to report an
 // unterminated block, then we want to show the start of the comment
 // we think is broken, not the end, where people will have to try and work
 // it out themselves.
 //
 int startLine = getLine();
```

```
 int offset    = getCharPositionInLine();
}


   : // Action and other blocks start with opening {
    //
  '{'
   (
     // And now we can match one of a number of embedded
     // elements within the action until we find a
     // } that balances the opening {. If we do not find
     // the balanced } then we will hit EOF and can issue
     // an error message about the brace that we belive to
     // be mismatched. This won't be foolproof but we will
     // be able to at least report an error against the
     // opening brace that we feel is in error and this will
     // guide the user to the correction as best we can.
     //


       // An embedded {} block
     //
     NESTED_ACTION

    | // What appears to be a literal
     //
     ACTION_CHAR_LITERAL

    | // We have assumed that the target language has C/Java
     // type comments.
     //
     COMMENT

    | // What appears to be a literal
     //
     ACTION_STRING_LITERAL

   | // What appears to be an escape sequence
     //
     ACTION_ESC

   | // Some other single character that is not
     // handled above
     //
     ~('\\'|'"'|'\''|'/'|'{'|'}')

   )*
 (
```

```
    // Correctly balanced closing brace
    //
    '}'

  | // Looks like have an imblanced {} block, report
    // with respect to the opening brace.
    //
    {
      // TODO: Report imbalanced {}
      System.out.println("Block starting  at line " + startLine + " offset " + (offset+1) + " contains imbalanced {} or
is missing a }");
    }
 )
 ;


// Keywords
// --------
// keywords used to specify ANTLR v3 grammars. Keywords may not be used as
// labels for rules or in any other context where they would be ambiguous
// with the keyword vs some other identifier
// OPTIONS, TOKENS, and CHANNELS must also consume the opening brace that captures
// their option block, as this is the easiest way to parse it separate
// to an ACTION block, despite it using the same {} delimiters.
//
OPTIONS     : 'options'  WSNLCHARS* '{'  ;
TOKENS_SPEC : 'tokens'   WSNLCHARS* '{'  ;
CHANNELS    : 'channels' WSNLCHARS* '{'  ;

IMPORT      : 'import'           ;
FRAGMENT    : 'fragment'            ;
LEXER       : 'lexer'            ;
PARSER      : 'parser'             ;
GRAMMAR     : 'grammar'            ;
TREE_GRAMMAR : 'tree' WSNLCHARS* 'grammar' ;
PROTECTED   : 'protected'          ;
PUBLIC      : 'public'            ;
PRIVATE     : 'private'            ;
RETURNS     : 'returns'            ;
LOCALS      : 'locals'            ;
THROWS      : 'throws'             ;
CATCH       : 'catch'           ;
FINALLY     : 'finally'            ;
MODE        : 'mode'             ;

// -----------
// Punctuation
//
```

```
// Character sequences used as separators, delimters, operators, etc
//
COLON       : ':'
        {
        // scan backwards, looking for a RULE_REF or TOKEN_REF.
        // which would indicate the start of a rule definition.
        // If we see a LPAREN, then it's the start of the subrule.
        // this.tokens is the token string we are pushing into, so
        // just loop backwards looking for a rule definition. Then
        // we set isLexerRule.
        Token t = getRuleOrSubruleStartToken();
        if ( t!=null ) {
            if ( t.getType()==RULE_REF ) isLexerRule = false;
            else if ( t.getType()==TOKEN_REF ) isLexerRule = true;
            // else must be subrule; don't alter context
        }
        }
       ;
COLONCOLON  : '::'              ;
COMMA       : ','              ;
SEMI        : ';'              ;
LPAREN      : '('              ;
RPAREN      : ')'              ;
RARROW      : '->'             ;
LT          : '<'             ;
GT          : '>'             ;
ASSIGN      : '='             ;
QUESTION    : '?'              ;
SYNPRED     : '=>'
    {
    Token t = new CommonToken(input, state.type, state.channel,
                  state.tokenStartCharIndex, getCharIndex()-1);
    t.setLine(state.tokenStartLine);
    t.setText(state.text);
    t.setCharPositionInLine(state.tokenStartCharPositionInLine);
    grammarError(ErrorType.V3_SYNPRED, t);
        $channel=HIDDEN;
    }
       ;
STAR        : '*'             ;
PLUS        : '+'             ;
PLUS_ASSIGN : '+='              ;
OR          : '|'             ;
DOLLAR      : '$'              ;
DOT         : '.'              ; // can be WILDCARD or DOT in qid or imported rule ref
RANGE       : '..'             ;
AT          : '@'              ;
POUND       : '#'              ;
```

```
NOT        : '~'              ;
RBRACE     : '}'              ;

/** Allow unicode rule/token names */
ID  : a=NameStartChar NameChar*
    {
    if ( Grammar.isTokenName($a.text) ) $type = TOKEN_REF;
    else $type = RULE_REF;
    }
    ;

fragment
NameChar   :  NameStartChar
        |  '0'..'9'
        |  '_'
        |  '\u00B7'
        |  '\u0300'..'\u036F'
        |  '\u203F'..'\u2040'
        ;

fragment
NameStartChar
        :  'A'..'Z' | 'a'..'z'
        |  '\u00C0'..'\u00D6'
        |  '\u00D8'..'\u00F6'
        |  '\u00F8'..'\u02FF'
        |  '\u0370'..'\u037D'
        |  '\u037F'..'\u1FFF'
        |  '\u200C'..'\u200D'
        |  '\u2070'..'\u218F'
        |  '\u2C00'..'\u2FEF'
        |  '\u3001'..'\uD7FF'
        |  '\uF900'..'\uFDCF'
        |  '\uFDF0'..'\uFEFE'
        |  '\uFF00'..'\uFFFD'
        ; // ignores | ['\u10000-'\uEFFFF] ;

// ---------------------------
// Literals embedded in actions
//
// Note that we have made the assumption that the language used within
// actions uses the fairly standard " and ' delimiters for literals and
// that within these literals, characters are escaped using the \ character.
// There are some languages which do not conform to this in all cases, such
// as by using /string/ and so on. We will have to deal with such cases if
// if they come up in targets.
//
```

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal characters. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically. While this rule is called CHAR it allows for the fact that
// some languages may use/allow ' as the string delimiter.
//
fragment
ACTION_CHAR_LITERAL
 : '\'' (('\\')=>ACTION_ESC | ~'\'')* '\''
 ;

// Within actions, or other structures that are not part of the ANTLR
// syntax, we may encounter literal strings. Within these, we do
// not want to inadvertantly match things like '}' and so we eat them
// specifically.
//
fragment
ACTION_STRING_LITERAL
 : '"' (('\\')=>ACTION_ESC | ~'"')* '"'
 ;

// Within literal strings and characters that are not part of the ANTLR
// syntax, we must allow for escaped character sequences so that we do not
// inadvertantly recognize the end of a string or character when the terminating
// delimiter has been esacped.
//
fragment
ACTION_ESC
 : '\\' .
 ;

// -------
// Integer
//
// Obviously (I hope) match an aribtrary long sequence of digits.
//
INT : ('0'..'9')+
  ;

// -----------
// Source spec
//
// A fragment rule for picking up information about an origrinating
// file from which the grammar we are parsing has been generated. This allows
// ANTLR to report errors against the originating file and not the generated
// file.
//
fragment

```
SRC : 'src' WSCHARS+ file=ACTION_STRING_LITERAL WSCHARS+ line=INT
   {
      // TODO: Add target specific code to change the source file name and current line number
      //
   }
   ;


// --------------
// Literal string
//
// ANTLR makes no disticintion between a single character literal and a
// multi-character string. All literals are single quote delimited and
// may contain unicode escape sequences of the form \uxxxx or \u{xxxxxx},
// where x is a valid hexadecimal number.
STRING_LITERAL
   : '\'' ( ( ESC_SEQ | ~('\\'|'\''|'\r'|'\n') ) )*
     (   '\''
     |   // Unterminated string literal
         {
         Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
         t.setLine(state.tokenStartLine);
         t.setText(state.text);
         t.setCharPositionInLine(state.tokenStartCharPositionInLine);
         grammarError(ErrorType.UNTERMINATED_STRING_LITERAL, t);
         }
     )
   ;


// A valid hex digit specification
//
fragment
HEX_DIGIT : ('0'..'9'|'a'..'f'|'A'..'F') ;


// Any kind of escaped character that we can embed within ANTLR
// literal strings.
//
fragment
ESC_SEQ
  : '\\'
    (
        // The standard escaped character set such as tab, newline, etc...
      'b'|'t'|'n'|'f'|'r'|'\''|'\\'

      | // A Java style Unicode escape sequence
        UNICODE_ESC

        | // A Swift/Hack style Unicode escape sequence
          UNICODE_EXTENDED_ESC
```

```
    | // An illegal escape seqeunce
     ~('b'|'t'|'n'|'f'|'r'|'\"'|'|'\\'|'u') // \x for any invalid x (make sure to match char here)
     {
        Token t = new CommonToken(input, state.type, state.channel, getCharIndex()-2, getCharIndex()-1);
        t.setText(t.getText());
        t.setLine(input.getLine());
        t.setCharPositionInLine(input.getCharPositionInLine()-2);
        grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t, input.substring(getCharIndex()-
2,getCharIndex()-1));
     }
   )
  ;


fragment
UNICODE_ESC
@init {

// Flag to tell us whether we have a valid number of
// hex digits in the escape sequence
//
int hCount = 0;
}
  :  'u' // Leadin for unicode escape sequence

    // We now require 4 hex digits. Note though
    // that we accept any number of characters
    // and issue an error if we do not get 4. We cannot
    // use an inifinite count such as + because this
    // might consume too many, so we lay out the lexical
    // options and issue an error at the invalid paths.
    //
 (
  (
    HEX_DIGIT  { hCount++; }
     (
       HEX_DIGIT  { hCount++; }
      (
        HEX_DIGIT  { hCount++; }
       (
         // Four valid hex digits, we are good
         //
         HEX_DIGIT { hCount++; }

        | // Three valid digits
       )

      | // Two valid digits
```

```
        )

      | // One valid digit
    )
     )
    | // No valid hex digits at all
  )

  // Now check the digit count and issue an error if we need to
  //
  {
   if (hCount < 4) {
   Interval badRange = Interval.of(getCharIndex()-2-hCount, getCharIndex());
   String lastChar = input.substring(badRange.b, badRange.b);
   if ( lastChar.codePointAt(0)=='\' ) {
    badRange.b--;
   }
   String bad = input.substring(badRange.a, badRange.b);
   Token t = new CommonToken(input, state.type, state.channel, badRange.a, badRange.b);
   t.setLine(input.getLine());
   t.setCharPositionInLine(input.getCharPositionInLine()-hCount-2);
   grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t, bad);
   }
  }
;


fragment
UNICODE_EXTENDED_ESC
  :  'u{' // Leadin for unicode extended escape sequence

    HEX_DIGIT+ // One or more hexadecimal digits

    '}' // Leadout for unicode extended escape sequence

    // Now check the digit count and issue an error if we need to
    {
      int numDigits = getCharIndex()-state.tokenStartCharIndex-6;
      if (numDigits > 6) {
        Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-
1);
        t.setText(t.getText());
        t.setLine(input.getLine());
        t.setCharPositionInLine(input.getCharPositionInLine()-numDigits);
        grammarError(ErrorType.INVALID_ESCAPE_SEQUENCE, t,
input.substring(state.tokenStartCharIndex,getCharIndex()-1));
    }
    }
  ;
```

```
// ----------
// Whitespace
//
// Characters and character constructs that are of no import
// to the parser and are used to make the grammar easier to read
// for humans.
//
WS
  : (
    ' '
    | '\t'
    | '\r'
    | '\n'
    | '\f'
    )+
    {$channel=HIDDEN;}
  ;

// A fragment rule for use in recognizing end of line in
// rules like COMMENT.
//
fragment
NLCHARS
  : '\n' | '\r'
  ;

// A fragment rule for recognizing traditional whitespace
// characters within lexer rules.
//
fragment
WSCHARS
  : ' ' | '\t' | '\f'
  ;

// A fragment rule for recognizing both traditional whitespace and
// end of line markers, when we don't care to distinguish but don't
// want any action code going on.
//
fragment
WSNLCHARS
  : ' ' | '\t' | '\f' | '\n' | '\r'
  ;

// This rule allows ANTLR 4 to parse grammars using the UTF-8 encoding with a
// byte order mark. Since this Unicode character doesn't appear as a token
// anywhere else in the grammar, we can simply skip all instances of it without
// problem. This rule will not break usage of \uFEFF inside a LEXER_CHAR_SET or
```

```
// STRING_LITERAL.
UnicodeBOM
  :  '\uFEFF' {skip();}
  ;


// -----------------
// Illegal Character
//
// This is an illegal character trap which is always the last rule in the
// lexer specification. It matches a single character of any value and being
// the last rule in the file will match when no other rule knows what to do
// about the character. It is reported as an error but is not passed on to the
// parser. This means that the parser to deal with the gramamr file anyway
// but we will not try to analyse or code generate from a file with lexical
// errors.
//
ERRCHAR
  : .
    {
      Token t = new CommonToken(input, state.type, state.channel, state.tokenStartCharIndex, getCharIndex()-1);
      t.setLine(state.tokenStartLine);
      t.setText(state.text);
      t.setCharPositionInLine(state.tokenStartCharPositionInLine);
      String msg = getTokenErrorDisplay(t) + " came as a complete surprise to me";
      grammarError(ErrorType.SYNTAX_ERROR, t, msg);
      state.syntaxErrors++;
      skip();
    }
  ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ANTLRLexer.g
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*/

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ANTLRParser.java
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*/

```
javaTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0f",
 "double":"0.0",
 "boolean":"false",
 "byte":"0",
 "short":"0",
 "char":"0",
 default:"null" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.misc.*;
import org.antlr.v4.runtime.tree.*;
import java.util.List;
import java.util.Iterator;
import java.util.ArrayList;

<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeListener;

/**
 * This interface defines a complete listener for a parse tree produced by
 * {@link <file.parserName>}.
 */
public interface <file.grammarName>Listener extends ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
```

```
* Enter a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Enter a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);
/**
<if(file.listenerLabelRuleNames.(lname))>
* Exit a parse tree produced by the {@code <lname>\}
* labeled alternative in {@link <file.parserName>#<file.listenerLabelRuleNames.(lname)>\}.
<else>
* Exit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
* @param ctx the parse tree
*/
void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>


BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>

import org.antlr.v4.runtime.ParserRuleContext;
import org.antlr.v4.runtime.tree.ErrorNode;
import org.antlr.v4.runtime.tree.TerminalNode;

/**
* This class provides an empty implementation of {@link <file.grammarName>Listener},
* which can be extended to create a listener which only needs to handle a subset
* of the available methods.
*/
public class <file.grammarName>BaseListener implements <file.grammarName>Listener {
 <file.listenerNames:{lname |
/**
* {@inheritDoc\}
*
* \<p>The default implementation does nothing.\</p>
*/
@Override public void enter<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}
/**
* {@inheritDoc\}
*
```

```
* \<p>The default implementation does nothing.\</p>
*/
@Override public void exit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { \}};
separator="\n">


 /**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void enterEveryRule(ParserRuleContext ctx) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void exitEveryRule(ParserRuleContext ctx) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitTerminal(TerminalNode node) { }
/**
  * {@inheritDoc\}
  *
  * \<p>The default implementation does nothing.\</p>
  */
 @Override public void visitErrorNode(ErrorNode node) { }
}
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.ParseTreeVisitor;

/**
* This interface defines a complete generic visitor for a parse tree produced
* by {@link <file.parserName>}.
*
* @param \<T> The return type of the visit operation. Use {@link Void} for
* operations with no return type.
*/
public interface <file.grammarName>Visitor\<T> extends ParseTreeVisitor\<T> {
```

```
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
 * Visit a parse tree produced by the {@code <lname>\}
 * labeled alternative in {@link <file.parserName>#<file.visitorLabelRuleNames.(lname)>\}.
<else>
 * Visit a parse tree produced by {@link <file.parserName>#<lname>\}.
<endif>
 * @param ctx the parse tree
 * @return the visitor result
 */
T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx);}; separator="\n">
}
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
package <file.genPackage>;
<endif>
<header>
import org.antlr.v4.runtime.tree.AbstractParseTreeVisitor;

/**
 * This class provides an empty implementation of {@link <file.grammarName>Visitor},
 * which can be extended to create a visitor which only needs to handle a subset
 * of the available methods.
 *
 * @param \<T> The return type of the visit operation. Use {@link Void} for
 * operations with no return type.
 */
public class <file.grammarName>BaseVisitor\<T> extends AbstractParseTreeVisitor\<T> implements
<file.grammarName>Visitor\<T> {
 <file.visitorNames:{lname |
/**
 * {@inheritDoc\}
 *
 * \<p>The default implementation returns the result of calling
 * {@link #visitChildren\} on {@code ctx\}.\</p>
 */
@Override public T visit<lname; format="cap">(<file.parserName>.<lname; format="cap">Context ctx) { return
visitChildren(ctx); \}}; separator="\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
>>
```

```
Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <parser.name> extends <superClass; null="Parser"> {
 static { RuntimeMetaData.checkVersion("<file.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
<if(parser.tokens)>
 public static final int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
<endif>
 public static final int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 private static String[] makeRuleNames() {
  return new String[] {
   <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
  };
 }
 public static final String[] ruleNames = makeRuleNames();

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 @Override
 public String getGrammarFileName() { return "<parser.grammarFileName; format="java-escape">"; }

 @Override
 public String[] getRuleNames() { return ruleNames; }

 @Override
 public String getSerializedATN() { return _serializedATN; }

 @Override
 public ATN getATN() { return _ATN; }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
```

```
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>


 <atn>
 }
>>


vocabulary(literalNames, symbolicNames) ::= <<
private static String[] makeLiteralNames() {
 return new String[] {
  <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _LITERAL_NAMES = makeLiteralNames();
private static String[] makeSymbolicNames() {
 return new String[] {
  <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
 };
}
private static final String[] _SYMBOLIC_NAMES = makeSymbolicNames();
public static final Vocabulary VOCABULARY = new VocabularyImpl(_LITERAL_NAMES,
_SYMBOLIC_NAMES);

/**
* @deprecated Use {@link #VOCABULARY} instead.
*/
@Deprecated
public static final String[] tokenNames;
static {
 tokenNames = new String[_SYMBOLIC_NAMES.length];
 for (int i = 0; i \< tokenNames.length; i++) {
  tokenNames[i] = VOCABULARY.getLiteralName(i);
  if (tokenNames[i] == null) {
   tokenNames[i] = VOCABULARY.getSymbolicName(i);
  }

  if (tokenNames[i] == null) {
   tokenNames[i] = "\<INVALID>";
  }
 }
}

@Override
```

```
@Deprecated
public String[] getTokenNames() {
 return tokenNames;
}

@Override

public Vocabulary getVocabulary() {
 return VOCABULARY;
}
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
@Override
public void action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 <f.name>_action((<f.ctxType>)_localctx, actionIndex);
 break;}; separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
@Override
public boolean sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex>:
 return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
 }
 return true;
}
<sempredFuncs.values; separator="\n">
<endif>
>>

parser_ctor(p) ::= <<
public <p.name>(TokenStream input) {
 super(input);
 _interp = new ParserATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}
>>

/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
```

```
*/
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 }
 }
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private boolean <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
case <index>:
 return <actions.(index)>;}; separator="\n">
 }
 return true;
 }
>>


RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=",">) throws RecognitionException {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, getState()<currentRule.args:{a | ,
<a.name>}>);
 enterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 <if(exceptions)>
```

```
<exceptions; separator="\n">
<else>
catch (RecognitionException re) {
 _localctx.exception = re;
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
}
<endif>
finally {
 <finallyAction>
 exitRule();
}
return _localctx;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public final <endif><currentRule.ctxType>
<currentRule.name>(<args; separator=", ">) throws RecognitionException {
 return <currentRule.name>(0<currentRule.args:{a | , <a.name>}>);
}

private <currentRule.ctxType> <currentRule.name>(int _p<args:{a | , <a>}>) throws RecognitionException {
 ParserRuleContext _parentctx = _ctx;
 int _parentState = getState();
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(_ctx, _parentState<currentRule.args:{a | ,
<a.name>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 enterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
}
 catch (RecognitionException re) {
 _localctx.exception = re;
```

```
 _errHandler.reportError(this, re);
 _errHandler.recover(this, re);
 }
 finally {
  <finallyAction>
  unrollRecursionContexts(_parentctx);
 }
 return _localctx;
 }
 >>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
enterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch (_input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
```

```
 break;
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 setState(<choice.stateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 <iteration>
} while ( <loopExpr> );
>>


// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1);<endif>
<preamble; separator="\n">
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i>:
```

```
<alt>
break;}; separator="\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
switch ( getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
setState(<choice.stateNumber>);
_errHandler.sync(this);
_alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 setState(<choice.loopBackStateNumber>);
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
}
>>


PlusBlock(choice, alts, error) ::= <<
setState(<choice.blockStartStateNumber>); <! alt block decision !>
_errHandler.sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 _errHandler.sync(this);
 _alt = getInterpreter().adaptivePredict(_input,<choice.decision>,_ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=org.antlr.v4.runtime.atn.ATN.INVALID_ALT_NUMBER );
```

```
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>

// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})>) && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChunks>
);
>>

MatchToken(m) ::= <<
```

```
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>match(<m.name>);
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }>_input.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = (Token)}><endif>_errHandler.recoverInline(this);
}
else {
 if ( _input.LA(1)==Token.EOF ) matchedEOF = true;
 _errHandler.reportMatch(this);
 consume();
}
>>


Wildcard(w) ::= <<
setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
setState(<p.stateNumber>);
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>


ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "skip();"
```

```
LexerMoreCommand()  ::= "more();"
LexerPopModeCommand() ::= "popMode();"


LexerTypeCommand(arg, grammar)      ::= "_type = <arg>;"
LexerChannelCommand(arg, grammar)  ::= "_channel = <arg>;"
LexerModeCommand(arg, grammar)     ::= "_mode = <arg>;"
LexerPushModeCommand(arg, grammar) ::= "pushMode(<arg>);"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<a.name>"
LocalRef(a) ::= "_localctx.<a.name>"
RetValueRef(a) ::= "_localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>;"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"


TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getText():null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getType():0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getLine():0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getCharPositionInLine():0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getChannel():0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label>!=null?<ctx(t)>.<t.label>.getTokenIndex():0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label>!=null?Integer.valueOf(<ctx(t)>.<t.label>.getText()):0)"


RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.start):null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_text(r)  ::=
"(<ctx(r)>.<r.label>!=null?_input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop):null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"


ThisRulePropertyRef_start(r) ::= "_localctx.start"
ThisRulePropertyRef_stop(r)  ::= "_localctx.stop"
ThisRulePropertyRef_text(r)  ::= "_input.getText(_localctx.start, _input.LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "this"


NonLocalAttrRef(s)  ::= "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name>"
SetNonLocalAttr(s, rhsChunks)  ::=
 "((<s.ruleName; format=\"cap\">Context)getInvokingContext(<s.ruleIndex>)).<s.name> = <rhsChunks>;"
```

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <t.name>"
TokenTypeDecl(t) ::= "int <t.name>;"
TokenListDecl(t) ::= "List\<Token> <t.name> = new ArrayList\<Token>()"
RuleContextDecl(r) ::= "<r.ctxName> <r.name>"
RuleContextListDecl(rdecl) ::= "List\<<rdecl.ctxName>> <rdecl.name> = new ArrayList\<<rdecl.ctxName>>()"

ContextTokenGetterDecl(t)   ::=
  "public TerminalNode <t.name>() { return getToken(<parser.name>.<t.name>, 0); }"
ContextTokenListGetterDecl(t) ::=
  "public List\<TerminalNode> <t.name>() { return getTokens(<parser.name>.<t.name>); }"
ContextTokenListIndexedGetterDecl(t) ::= <<
public TerminalNode <t.name>(int i) {
 return getToken(<parser.name>.<t.name>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>() {
 return getRuleContext(<r.ctxName>.class,0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public List\<<r.ctxName>\> <r.name>() {
 return getRuleContexts(<r.ctxName>.class);
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <r.name>(int i) {
 return getRuleContext(<r.ctxName>.class,i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)   ::= "_tset<id>"
ListLabelName(label)   ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = _input.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = _input.LA(1);"

```
StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers)
 ::= <<
public static class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) { super(parent, invokingState);
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>) {
  super(parent, invokingState);
  <struct.ctorAttrs:{a | this.<a.name> = <a.name>;}; separator="\n">
 }
 @Override public int getRuleIndex() { return RULE_<struct.derivedFromName>; }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public void copyFrom(<struct.name> ctx) {
  super.copyFrom(ctx);
  <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
 }
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public static class <struct.name> extends <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context ctx) { copyFrom(ctx); }
 <dispatchMethods; separator="\n">
 }
>>


ListenerDispatchMethod(method) ::= <<
@Override
public void <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener listener) {
 if ( listener instanceof <parser.grammarName>Listener )
((<parser.grammarName>Listener)listener).<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName;
format="cap">(this);
 }
>>


VisitorDispatchMethod(method) ::= <<
@Override
public \<T> T accept(ParseTreeVisitor\<? extends T> visitor) {
 if ( visitor instanceof <parser.grammarName>Visitor ) return ((<parser.grammarName>Visitor\<? extends
```

```
T>)visitor).visit<struct.derivedFromName; format="cap">(this);
 else return visitor.visitChildren(this);
}
>>


AttributeDecl(d) ::= "<d.type> <d.name><if(d.initValue)> = <d.initValue><endif>"


/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>((<x.ctx.name>)_localctx).<endif><x.name>"


/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "((<actionChunk.ctx.name>)_localctx)"


// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "precpred(_ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()              ::= "_ctx.stop = _input.LT(-1);"


recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
<if(label)>_localctx.<label> = _prevctx;<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>


recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
pushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>


recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
_ctx = _localctx;
_prevctx = _localctx;
```

```
>>

recRuleSetPrevCtx() ::= <<
if ( _parseListeners!=null ) triggerExitRuleEvent();
_prevctx = _localctx;
>>


LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<if(lexerFile.genPackage)>
package <lexerFile.genPackage>;
<endif>
<namedActions.header>
import org.antlr.v4.runtime.Lexer;
import org.antlr.v4.runtime.CharStream;
import org.antlr.v4.runtime.Token;
import org.antlr.v4.runtime.TokenStream;
import org.antlr.v4.runtime.*;
import org.antlr.v4.runtime.atn.*;
import org.antlr.v4.runtime.dfa.DFA;
import org.antlr.v4.runtime.misc.*;

<lexer>
>>


Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
@SuppressWarnings({"all", "warnings", "unchecked", "unused", "cast"})
public class <lexer.name> extends <superClass; null="Lexer"> {
 static { RuntimeMetaData.checkVersion("<lexerFile.ANTLRVersion>", RuntimeMetaData.VERSION); }

 protected static final DFA[] _decisionToDFA;
 protected static final PredictionContextCache _sharedContextCache =
  new PredictionContextCache();
<if(lexer.tokens)>
 public static final int
  <lexer.tokens:{k | <k>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
<endif>
<if(lexer.channels)>
 public static final int
  <lexer.channels:{c | <c>=<lexer.channels.(c)>}; separator=", ", wrap, anchor>;
<endif>
<if(rest(lexer.modes))>
 public static final int
  <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
<endif>
 public static String[] channelNames = {
  "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ",
```

```
wrap, anchor><endif>
};

public static String[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

private static String[] makeRuleNames() {
 return new String[] {
  <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };
}
public static final String[] ruleNames = makeRuleNames();

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

<namedActions.members>

public <lexer.name>(CharStream input) {
 super(input);
 _interp = new LexerATNSimulator(this,_ATN,_decisionToDFA,_sharedContextCache);
}

@Override
public String getGrammarFileName() { return "<lexer.grammarFileName>"; }

@Override
public String[] getRuleNames() { return ruleNames; }

@Override
public String getSerializedATN() { return _serializedATN; }

@Override
public String[] getChannelNames() { return channelNames; }

@Override
public String[] getModeNames() { return modeNames; }

@Override
public ATN getATN() { return _ATN; }

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
}
>>

SerializedATN(model) ::= <<
<if(rest(model.segments))>
```

```
<! requires segmented representation !>
private static final int _serializedATNSegments = <length(model.segments)>;
<model.segments:{segment|private static final String _serializedATNSegment<i0> =
 "<segment; wrap={"+<\n><\t>"}>";}; separator="\n">
public static final String _serializedATN = Utils.join(
 new String[] {
  <model.segments:{segment | _serializedATNSegment<i0>}; separator=",\n">
 },
 ""
);
<else>
<! only one segment, can be inlined !>
public static final String _serializedATN =
 "<model.serialized; wrap={"+<\n><\t>"}>";
<endif>
public static final ATN _ATN =
 new ATNDeserializer().deserialize(_serializedATN.toCharArray());
static {
 _decisionToDFA = new DFA[_ATN.getNumberOfDecisions()];
 for (int i = 0; i \< _ATN.getNumberOfDecisions(); i++) {
  _decisionToDFA[i] = new DFA(_ATN.getDecisionState(i), i);
 }
<! org.antlr.v4.tool.DOTGenerator dot = new org.antlr.v4.tool.DOTGenerator(null);!>
<! System.out.println(dot.getDOT(_ATN.decisionToState.get(0), ruleNames, false));!>
<! System.out.println(dot.getDOT(_ATN.ruleToStartState[2], ruleNames, false));!>
}
>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javaTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".java"
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/Java/Java.stg
No license file was found, but licenses were detected in source scan.

```
phpTypeInitMap ::= [
 "int":"0",
 "long":"0",
 "float":"0.0",
 "double":"0.0",
 "boolean":"false",
 default:"null"
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage>;
<endif>
<header>
use Antlr\\Antlr4\\Runtime\\Tree\\ParseTreeListener;
```

```
/**
 * This interface defines a complete listener for a parse tree produced by
 * {@see <file.parserName>}.
 */
interface <file.grammarName>Listener extends ParseTreeListener {
 <file.listenerNames:{lname |
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Enter a parse tree produced by the `<lname>`
 * labeled alternative in {@see <file.parserName>::<file.listenerLabelRuleNames.(lname)>()\}.
<else>
 * Enter a parse tree produced by {@see <file.parserName>::<lname>()\}.
<endif>
 * @param $context The parse tree.
 */
public function enter<lname; format="cap">(Context\\<lname; format="cap">Context $context) : void;
/**
<if(file.listenerLabelRuleNames.(lname))>
 * Exit a parse tree produced by the `<lname>` labeled alternative
 * in {@see <file.parserName>::<file.listenerLabelRuleNames.(lname)>()\}.
<else>
 * Exit a parse tree produced by {@see <file.parserName>::<lname>()\}.
<endif>
 * @param $context The parse tree.
 */
public function exit<lname; format="cap">(Context\\<lname; format="cap">Context $context) : void;};
separator="\n">
}
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage>;
<endif>
<header>

use Antlr\\Antlr4\\Runtime\\ParserRuleContext;
use Antlr\\Antlr4\\Runtime\\Tree\\ErrorNode;
use Antlr\\Antlr4\\Runtime\\Tree\\TerminalNode;

/**
 * This class provides an empty implementation of {@see <file.grammarName>Listener},
 * which can be extended to create a listener which only needs to handle a subset
 * of the available methods.
 */
class <file.grammarName>BaseListener implements <file.grammarName>Listener
{
```

```
 <file.listenerNames:{lname |
/**
 * {@inheritdoc\}
 *
 * The default implementation does nothing.
 */
public function enter<lname; format="cap">(Context\\<lname; format="cap">Context $context) : void {\}


/**
 * {@inheritdoc\}
 *
 * The default implementation does nothing.
 */
public function exit<lname; format="cap">(Context\\<lname; format="cap">Context $context) : void {\}};
separator="\n">

 /**
  * {@inheritdoc\}
  *
  * The default implementation does nothing.
  */
 public function enterEveryRule(ParserRuleContext $context) : void {}


 /**
  * {@inheritdoc\}
  *
  * The default implementation does nothing.
  */
 public function exitEveryRule(ParserRuleContext $context) : void {}


 /**
  * {@inheritdoc\}
  *
  * The default implementation does nothing.
  */
 public function visitTerminal(TerminalNode $node) : void {}


 /**
  * {@inheritdoc\}
  *
  * The default implementation does nothing.
  */
 public function visitErrorNode(ErrorNode $node) : void {}
}
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
```

```
<if(file.genPackage)>
namespace <file.genPackage>;
<endif>


<header>
use Antlr\\Antlr4\\Runtime\\Tree\\ParseTreeVisitor;

/**
 * This interface defines a complete generic visitor for a parse tree produced by {@see <file.parserName>}.
 */
interface <file.grammarName>Visitor extends ParseTreeVisitor
{
 <file.visitorNames:{lname |
/**
<if(file.visitorLabelRuleNames.(lname))>
 * Visit a parse tree produced by the `<lname>` labeled alternative
 * in {@see <file.parserName>::<file.visitorLabelRuleNames.(lname)>()\}.
<else>
 * Visit a parse tree produced by {@see <file.parserName>::<lname>()\}.
<endif>
 *
 * @param Context\\<lname; format="cap">Context $context The parse tree.
 *
 * @return mixed The visitor result.
 */
public function visit<lname; format="cap">(Context\\<lname; format="cap">Context $context);};
separator="\n\n">
}
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage>;
<endif>
<header>
use Antlr\\Antlr4\\Runtime\\Tree\\AbstractParseTreeVisitor;

/**
 * This class provides an empty implementation of {@see <file.grammarName>Visitor},
 * which can be extended to create a visitor which only needs to handle a subset
 * of the available methods.
 */
class <file.grammarName>BaseVisitor extends AbstractParseTreeVisitor implements <file.grammarName>Visitor
{
 <file.visitorNames:{lname |
/**
 * {@inheritdoc\}
```

```
 *
 * The default implementation returns the result of calling
 * {@see self::visitChildren()\} on `context`.
 */
public function visit<lname; format="cap">(Context\\<lname; format="cap">Context $context)
{
   return $this->visitChildren($context);
\}}; separator="\n\n">
}
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
\<?php

/*
 * Generated from <grammarFileName> by ANTLR <ANTLRVersion>
 */

>>
Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>


Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
namespace<if(file.genPackage)> <file.genPackage><endif> {
<if(namedActions.header)><namedActions.header><endif>
 use Antlr\\Antlr4\\Runtime\\Atn\\ATN;
 use Antlr\\Antlr4\\Runtime\\Atn\\ATNDeserializer;
 use Antlr\\Antlr4\\Runtime\\Atn\\ParserATNSimulator;
 use Antlr\\Antlr4\\Runtime\\Dfa\\DFA;
 use Antlr\\Antlr4\\Runtime\\Error\\Exceptions\\FailedPredicateException;
 use Antlr\\Antlr4\\Runtime\\Error\\Exceptions\\NoViableAltException;
 use Antlr\\Antlr4\\Runtime\\PredictionContexts\\PredictionContextCache;
 use Antlr\\Antlr4\\Runtime\\Error\\Exceptions\\RecognitionException;
 use Antlr\\Antlr4\\Runtime\\RuleContext;
 use Antlr\\Antlr4\\Runtime\\Token;
 use Antlr\\Antlr4\\Runtime\\TokenStream;
 use Antlr\\Antlr4\\Runtime\\Vocabulary;
 use Antlr\\Antlr4\\Runtime\\VocabularyImpl;
 use Antlr\\Antlr4\\Runtime\\RuntimeMetaData;
 use Antlr\\Antlr4\\Runtime\\Parser;
<if(namedActions.definitions)><namedActions.definitions><endif>

 final class <parser.name> extends <superClass; null="Parser">
 {
  <if(parser.tokens)>
  public const <parser.tokens:{k | <k> = <parser.tokens.(k)>}; separator=", ", wrap, anchor>;
  <endif>
```

```
public const <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;

/**
 * @var array\<string>
 */
public const RULE_NAMES = [
 <parser.ruleNames:{r | '<r>'}; separator=", ", wrap, anchor>
];

<vocabulary(parser.literalNames, parser.symbolicNames)>

<atn>
protected static $atn;
protected static $decisionToDFA;
protected static $sharedContextCache;
<if(namedActions.members)>

<namedActions.members>
<endif>


<parser:(ctor)()>

private static function initialize() : void
{
if (self::$atn !== null) {
 return;
 }

 RuntimeMetaData::checkVersion('<file.ANTLRVersion>', RuntimeMetaData::VERSION);

 $atn = (new ATNDeserializer())->deserialize(self::SERIALIZED_ATN);

 $decisionToDFA = [];
 for ($i = 0, $count = $atn->getNumberOfDecisions(); $i \< $count; $i++) {
 $decisionToDFA[] = new DFA($atn->getDecisionState($i), $i);
 }

 self::$atn = $atn;
 self::$decisionToDFA = $decisionToDFA;
 self::$sharedContextCache = new PredictionContextCache();
 }

public function getGrammarFileName() : string
{
 return "<parser.grammarFileName>";
 }
```

```
  public function getRuleNames() : array
  {
   return self::RULE_NAMES;
  }

  public function getSerializedATN() : string
  {
   return self::SERIALIZED_ATN;
  }

  public function getATN() : ATN
  {
   return self::$atn;
  }

  public function getVocabulary() : Vocabulary
     {
        static $vocabulary;

   return $vocabulary = $vocabulary ?? new VocabularyImpl(self::LITERAL_NAMES, self::SYMBOLIC_NAMES);
     }
<if(funcs)>

  <funcs; separator="\n\n">
<endif>
<if(sempredFuncs)>

  public function sempred(?RuleContext $localContext, int $ruleIndex, int $predicateIndex) : bool
  {
   switch ($ruleIndex) {
   <parser.sempredFuncs.values:{f|
  case <f.ruleIndex>:
   return $this->sempred<f.name; format="cap">($localContext, $predicateIndex);}; separator="\n\n">

    default:
     return true;
    }
  }

  <sempredFuncs.values; separator="\n\n">
<endif>
  }
 }

 namespace <if(file.genPackage)><file.genPackage>\\<endif>Context {
  use Antlr\\Antlr4\\Runtime\\ParserRuleContext;
  use Antlr\\Antlr4\\Runtime\\Token;
```

```
use Antlr\\Antlr4\\Runtime\\Tree\\ParseTreeVisitor;
use Antlr\\Antlr4\\Runtime\\Tree\\TerminalNode;
use Antlr\\Antlr4\\Runtime\\Tree\\ParseTreeListener;
use <if(file.genPackage)><file.genPackage>\\<endif><parser.name>;
<if (file.genVisitor)>use <if(file.genPackage)><file.genPackage>\\<endif><file.grammarName>Visitor;<endif>
<if (file.genListener)>use <if(file.genPackage)><file.genPackage>\\<endif><file.grammarName>Listener;<endif>
<namedActions.contexts>

<funcs :{ func | <func.ruleCtx><if(func.altLabelCtxs)>

<func.altLabelCtxs:{l | <func.altLabelCtxs.(l)>}; separator="\n\n"><endif> }; separator="\n\n">
}
>>

vocabulary(literalNames, symbolicNames) ::= <<
/**
 * @var array\<string|null>
 */
private const LITERAL_NAMES = [
    <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
];

/**
 * @var array\<string>
 */
private const SYMBOLIC_NAMES = [
    <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
];
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>

public function action(?RuleContext $localContext, int $ruleIndex, int $actionIndex) : void
{
switch ($ruleIndex) {
<recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 $this->action<f.name; format="cap">($localContext, $actionIndex);
 break;}; separator="\n\n">
 }
}

<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>

public function sempred(?RuleContext $localContext, int $ruleIndex, int $predicateIndex) : bool
```

```
{
 switch ($ruleIndex) {
<recog.sempredFuncs.values:{f|
  case <f.ruleIndex>:
     return $this->sempred<f.name; format="cap">($localContext, $predicateIndex);}; separator="\n\n">
 }

 return true;
 }
<sempredFuncs.values; separator="\n\n">
<endif>
>>


parser_ctor(p) ::= <<
public function __construct(TokenStream $input)
{
 parent::__construct($input);

 self::initialize();

 $this->interp = new ParserATNSimulator($this, self::$atn, self::$decisionToDFA, self::$sharedContextCache);
}
>>


/**
* This generates a private method since the actionIndex is generated, making
* an overriding implementation impossible to maintain.
*/
RuleActionFunction(r, actions) ::= <<
private function action<r.name; format="cap">(?<r.ctxType> $localContext, int $actionIndex) : void
{
 switch ($actionIndex) {
<actions:{index|
case <index>:
<actions.(index)>

 break;}; separator="\n\n">
 }
 }
>>


/**
* This generates a private method since the predicateIndex is generated, making
* an overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
private function sempred<r.name; format="cap">(?Context\\<r.ctxType> $localContext, int $predicateIndex) : bool
{
```

```
 switch ($predicateIndex) {
<actions:{index|
  case <index>:
     return <actions.(index)>;}; separator="\n\n">
 }

 return true;
 }
>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,exceptions,postamble)
::= <<
/**
 * @throws RecognitionException
 */
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><endif>public function <currentRule.name>(<args;
separator=",">) : Context\\<currentRule.ctxType>
{
  $localContext = new Context\\<currentRule.ctxType>($this->ctx, $this->getState()<currentRule.args:{a | ,
$<a.name>}>);

  $this->enterRule($localContext, <currentRule.startState>, self::RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">

  try {
     <code>
     <postamble; separator="\n">
     <namedActions.after>
  }<if(exceptions)><exceptions; separator="\n"><else> catch (RecognitionException $exception) {
     $localContext->exception = $exception;
     $this->errorHandler->reportError($this, $exception);
     $this->errorHandler->recover($this, $exception);
  }<endif> finally {
     <finallyAction>
     $this->exitRule();
  }

  return $localContext;
}
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamb
le) ::= <<
/**
 * @throws RecognitionException
 */
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><endif>public function <currentRule.name>(<args;
```

```
separator=", ">) : Context\\<currentRule.ctxType>
{
 return $this->recursive<currentRule.name; format="cap">(0<currentRule.args:{a | , <a.name>}>);
}

/**
* @throws RecognitionException
*/
private function recursive<currentRule.name; format="cap">(int $precedence<args:{a | , <a>}>) :
Context\\<currentRule.ctxType>
{
 $parentContext = $this->ctx;
 $parentState = $this->getState();
 $localContext = new Context\\<currentRule.ctxType>($this->ctx, $parentState<currentRule.args:{a | ,
<a.name>}>);
 $previousContext = $localContext;
 $startState = <currentRule.startState>;
 $this->enterRecursionRule($localContext, <currentRule.startState>, self::RULE_<currentRule.name>,
$precedence);
 <namedActions.init>
 <locals; separator="\n">

 try {
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 } catch (RecognitionException $exception) {
 $localContext->exception = $exception;
 $this->errorHandler->reportError($this, $exception);
 $this->errorHandler->recover($this, $exception);
 } finally {
 <finallyAction>
 $this->unrollRecursionContexts($parentContext);
 }

 return $localContext;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>$localContext = new
Context\\<currentOuterMostAltCodeBlock.altLabel; format="cap">Context($localContext);<endif>
$this->enterOuterAlt($localContext, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
```

```
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);
<if(choice.label)><labelref(choice.label)> = $this->input->LT(1);<endif>
<preamble; separator="\n">

switch ($this->input->LA(1)) {
  <choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n\n">

default:
 <error>
 }
>>


LL1OptionalBlock(choice, alts, error) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);

switch ($this->input->LA(1)) {
  <choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n\n">

default:
 break;
 }
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);
<preamble; separator="\n">

if (<expr>) {
 <alts; separator="\n">
 }
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);
```

```
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 $this->setState(<choice.loopBackStateNumber>);
 $this->errorHandler->sync($this);
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
$this->setState(<choice.blockStartStateNumber>); <! alt block decision !>
$this->errorHandler->sync($this);

<preamble; separator="\n">
do {
 <alts; separator="\n">
 $this->setState(<choice.stateNumber>); <! loopback/exit decision !>
 $this->errorHandler->sync($this);
 <iteration>
} while (<loopExpr>);
>>


// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);
<if(choice.label)><labelref(choice.label)> = $this->input->LT(1);<endif>
<preamble; separator="\n">

switch ($this->getInterpreter()->adaptivePredict($this->input, <choice.decision>, $this->ctx)) {
 <alts:{alt |
case <i>:
   <alt>
break;}; separator="\n\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);

switch ($this->getInterpreter()->adaptivePredict($this->input, <choice.decision>, $this->ctx)) {
<alts:{alt |
  case <i><if(!choice.ast.greedy)>+1<endif>:
    <alt>
 break;}; separator="\n\n">
}
```

```
>>

StarBlock(choice, alts, sync, iteration) ::= <<
$this->setState(<choice.stateNumber>);
$this->errorHandler->sync($this);

$alt = $this->getInterpreter()->adaptivePredict($this->input, <choice.decision>, $this->ctx);

while ($alt !== <choice.exitAlt> && $alt !== ATN::INVALID_ALT_NUMBER) {
 if ($alt === 1<if(!choice.ast.greedy)>+1<endif>) {
  <iteration>
  <alts> <! should only be one !>
 }

 $this->setState(<choice.loopBackStateNumber>);
 $this->errorHandler->sync($this);

 $alt = $this->getInterpreter()->adaptivePredict($this->input, <choice.decision>, $this->ctx);
}
>>

PlusBlock(choice, alts, error) ::= <<
$this->setState(<choice.blockStartStateNumber>); <! alt block decision !>
$this->errorHandler->sync($this);

$alt = 1<if(!choice.ast.greedy)>+1<endif>;

do {
 switch ($alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n\n">
 default:
  <error>
 }

 $this->setState(<choice.loopBackStateNumber>); <! loopback/exit decision !>
 $this->errorHandler->sync($this);

 $alt = $this->getInterpreter()->adaptivePredict($this->input, <choice.decision>, $this->ctx);
} while ($alt !== <choice.exitAlt> && $alt !== ATN::INVALID_ALT_NUMBER);
>>

Sync(s) ::= "sync(<s.expecting.name>);"

ThrowNoViableAlt(t) ::= "throw new NoViableAltException($this);"
```

```
TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) === 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftConst(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>($<shiftAmount> - <offset>)<else>$<shiftAmount><endif>
%>
offsetShiftConst(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(self::<shiftAmount> - <offset>)<else>self::<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | $<s.varName> === self::<ttype>}; separator=" || ">
%>


cases(ttypes) ::= <<
<ttypes:{t | case self::<t>:}; separator="\n">
>>


InvokeRule(r, argExprsChunks) ::= <<
$this->setState(<r.stateNumber>);
<if(r.labels)><r.labels:{l | <labelref(l)> = }><endif>$this-><if(r.ast.options.p)>recursive<r.name;
format="cap"><else><r.name><endif>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif>
<argExprsChunks>);
>>


MatchToken(m) ::= <<
$this->setState(<m.stateNumber>);
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>$this->match(self::<m.name>);
>>
```

```
MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
$this->setState(<m.stateNumber>);

<if(m.labels)><m.labels:{l | <labelref(l)> = }>$this->input->LT(1);<endif>
<capture>

if (<if(invert)>$<m.varName> \<= 0 || <else>!<endif>(<expr>)) {
    <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>$this->errorHandler->recoverInline($this);
} else {
 if ($this->input->LA(1) === Token::EOF) {
    $this->matchedEOF = true;
  }

 $this->errorHandler->reportMatch($this);
 $this->consume();
}
>>

Wildcard(w) ::= <<
$this->setState(<w.stateNumber>);
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>$this->matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
$this->setState(<p.stateNumber>);

if (!(<chunks>)) {
  throw new FailedPredicateException($this, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>);
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>
```

// lexer actions are not associated with model objects

```
LexerSkipCommand()  ::= "$this->skip();"
LexerMoreCommand()  ::= "$this->more();"
LexerPopModeCommand() ::= "$this->popMode();"


LexerTypeCommand(arg, grammar)     ::= "$this->type = <arg>;"
LexerChannelCommand(arg, grammar)  ::= "$this->channel = <arg>;"
LexerModeCommand(arg, grammar)     ::= "$this->mode = <arg>;"
LexerPushModeCommand(arg, grammar) ::= "$this->pushMode(<arg>);"


ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "$localContext-><a.name>"
LocalRef(a) ::= "$localContext-><a.name>"
RetValueRef(a) ::= "$localContext-><a.name>"
QRetValueRef(a) ::= "<ctx(a)>-><a.dict>-><a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>-><t.name>"
LabelRef(t) ::= "<ctx(t)>-><t.name>"
ListLabelRef(t) ::= "<ctx(t)>-><ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>-><s.name> = <rhsChunks>;"


TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"


TokenPropertyRef_text(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getText() : null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getType() : 0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getLine() : 0)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getCharPositionInLine() : 0)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getChannel() : 0)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>-><t.label> !== null ? <ctx(t)>-><t.label>->getTokenIndex() : 0)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>-><t.label> !== null ? (int) <ctx(t)>-><t.label>->getText() : 0)"


RulePropertyRef_start(r) ::= "(<ctx(r)>-><r.label> !== null ? (<ctx(r)>-><r.label>->start) : null)"
RulePropertyRef_stop(r)  ::= "(<ctx(r)>-><r.label> !== null ? (<ctx(r)>-><r.label>->stop) : null)"
RulePropertyRef_text(r)  ::= "(<ctx(r)>-><r.label> !== null ? $this->input->getTextByTokens(<ctx(r)>-><r.label>->start, <ctx(r)>-><r.label>->stop) : null)"
RulePropertyRef_ctx(r)  ::= "<ctx(r)>-><r.label>"
RulePropertyRef_parser(r)::= "\$this"


ThisRulePropertyRef_start(r) ::= "$localContext->start"
ThisRulePropertyRef_stop(r)  ::= "$localContext->stop"
ThisRulePropertyRef_text(r)  ::= "$this->input->getTextByTokens($localContext->start, $this->input->LT(-1))"
ThisRulePropertyRef_ctx(r)  ::= "$localContext"
ThisRulePropertyRef_parser(r)::= "$this"
```

NonLocalAttrRef(s)   ::= "\$this->getInvokingContext(<s.ruleIndex>)-><s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "\$this->getInvokingContext(<s.ruleIndex>)-><s.name> = <rhsChunks>;"

AddToLabelList(a) ::= "<ctx(a.label)>-><a.listName>[] = <labelref(a.label)>;"

TokenDecl(t) ::= "<TokenLabelType()> $<t.name>"
TokenTypeDecl(t) ::= ""
TokenListDecl(t) ::= "array $<t.name> = []"
RuleContextDecl(r) ::= "<r.ctxName> $<r.name>"
RuleContextListDecl(rdecl) ::= "array $<rdecl.name> = []"
AttributeDecl(d) ::= "<d.type> $<d.name><if(d.initValue)> = <d.initValue><endif>"

PropertiesDecl(struct) ::= <<
<if(struct.tokenListDecls)>
 <struct.tokenListDecls : {d | /**
 * @var array\<Token>|null $<d.name>
 */
public $<d.name>;}; separator="\n\n">
<endif>
<if(struct.tokenDecls)>
<if(struct.tokenListDecls)>

<endif>
 <struct.tokenDecls : {d | /**
 * @var <TokenLabelType()>|null $<d.name>
 */
public $<d.name>;}; separator="\n\n">
<endif>
<if(struct.ruleContextDecls)>
<if(struct.tokenListDecls || struct.tokenDecls)>

<endif>
 <struct.ruleContextDecls : {d | /**
 * @var <d.ctxName>|null $<d.name>
 */
public $<d.name>;}; separator="\n\n">
<endif>
<if(struct.ruleContextListDecls)>
<if(struct.tokenListDecls || struct.tokenDecls || struct.ruleContextDecls)>

<endif>
 <struct.ruleContextListDecls : {d | /**
 * @var array\<<d.ctxName>\>|null $<d.name>
 */
public $<d.name>;}; separator="\n\n">
<endif>
<if(struct.attributeDecls)>
<if(struct.tokenListDecls || struct.tokenDecls || struct.ruleContextDecls || struct.ruleContextListDecls)>

```
<endif>
 <struct.attributeDecls : {d | /**
* @var <d.type><if(!d.initValue)>|null<endif> $<d.name>
*/
public $<d.name><if(d.initValue)> = <d.initValue><endif>;}; separator="\n\n">
<endif>


>>


ContextTokenGetterDecl(t) ::= <<
public function <t.name>() : ?TerminalNode
{
  return $this->getToken(<parser.name>::<t.name>, 0);
}
>>


ContextTokenListGetterDecl(t)  ::= <<
>>


ContextTokenListIndexedGetterDecl(t)  ::= <<
/**
* @return array\<TerminalNode>|TerminalNode|null
*/
public function <t.name>(?int $index = null)
{
 if ($index === null) {
  return $this->getTokens(<parser.name>::<t.name>);
 }

   return $this->getToken(<parser.name>::<t.name>, $index);
}
>>


ContextRuleGetterDecl(r)      ::= <<
public function <r.name>() : ?<r.ctxName>
{
 return $this->getTypedRuleContext(<r.ctxName>::class, 0);
}
>>


ContextRuleListGetterDecl(r)   ::= <<
>>


ContextRuleListIndexedGetterDecl(r)   ::= <<
/**
* @return array\<<r.ctxName>\>|<r.ctxName>|null
*/
```

```
public function <r.name>(?int $index = null)
{
 if ($index === null) {
  return $this->getTypedRuleContexts(<r.ctxName>::class);
 }

   return $this->getTypedRuleContext(<r.ctxName>::class, $index);
}
>>

LexerRuleContext() ::= "RuleContext"

/**
 * The rule context name is the rule followed by a suffix; e.g., r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "$<d.varName> = \$this->input->LT(1);"
CaptureNextTokenType(d) ::= "$<d.varName> = $this->input->LA(1);"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name> extends
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)> implements
<interfaces; separator=", "><endif>
{
<PropertiesDecl(struct)>
 public function __construct(?ParserRuleContext $parent, ?int $invokingState = null<ctorAttrs:{a | , ?<a> = null}>)
 {
  parent::__construct($parent, $invokingState);
<if(struct.ctorAttrs)>

  <struct.ctorAttrs:{a | $this-><a.name> = $<a.name> ?? $this-><a.name>;}; separator="\n">
<endif>
 }

 public function getRuleIndex() : int
 {
    return <parser.name>::RULE_<struct.derivedFromName>;
  }
<if(getters)>

  <getters:{g | <g>}; separator="\n\n">
<endif>
```

```
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
public function copyFrom(ParserRuleContext $context) : void
{
 parent::copyFrom($context);

 <struct.attrs:{a | $this-><a.name> = $context-><a.name>;}; separator="\n">
}
<endif>
<if(dispatchMethods)>

<dispatchMethods; separator="\n\n">
<endif>
<if(extensionMembers)>

<extensionMembers; separator="\n\n">
<endif>
}
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name> extends <struct.parentRule; format="cap">Context
{
<PropertiesDecl(struct)>
public function __construct(<struct.parentRule; format="cap">Context $context)
{
    parent::__construct($context);

    $this->copyFrom($context);
  }
<if(getters)>

  <getters:{g | <g>}; separator="\n\n">
<endif>
<if(dispatchMethods)>

<dispatchMethods; separator="\n\n">
<endif>
}
>>


ListenerDispatchMethod(method) ::= <<
public function <if(method.isEnter)>enter<else>exit<endif>Rule(ParseTreeListener $listener) : void
{
 if ($listener instanceof <parser.grammarName>Listener) {
    $listener-><if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">($this);
  }
}
>>
```

```
VisitorDispatchMethod(method) ::= <<
public function accept(ParseTreeVisitor $visitor)
{
 if ($visitor instanceof <parser.grammarName>Visitor) {
    return $visitor->visit<struct.derivedFromName; format="cap">($this);
  }

 return $visitor->visitChildren($this);
}
>>

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>$localContext-><endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "$localContext"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "\$this->precpred(\$this->ctx, <opPrec>)"

recRuleSetReturnAction(src,name)   ::= "\$<name> = \$<src>-><name>;"

recRuleSetStopToken()            ::= "$this->ctx->stop = $this->input->LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
$localContext = new Context\\<ctxName>Context($parentContext, $parentState);
<if(label)>
<if(isListLabel)>
$localContext-><label>[] = $previousContext;
<else>
$localContext-><label> = $previousContext;
<endif>
<endif>

$this->pushNewRecursionContext($localContext, $startState, self::RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
$localContext = new Context\\<currentAltLabel; format="cap">Context(new Context\\<ruleName;
format="cap">Context($parentContext, $parentState));
<if(label)>
<if(isListLabel)>
$localContext-><label>[] = $previousContext;
<else>
$localContext-><label> = $previousContext;
<endif>
<endif>
```

```
$this->pushNewRecursionContext($localContext, $startState, self::RULE_<ruleName>);
>>


recRuleReplaceContext(ctxName) ::= <<
$localContext = new Context\\<ctxName>Context($localContext);
$this->ctx = $localContext;
$previousContext = $localContext;
>>


recRuleSetPrevCtx() ::= <<
if ($this->getParseListeners() !== null) {
    $this->triggerExitRuleEvent();
}

$previousContext = $localContext;
>>



LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
<lexer>
>>


Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
namespace<if(lexerFile.genPackage)> <lexerFile.genPackage><endif> {
<if(namedActions.header)><namedActions.header><endif>
 use Antlr\\Antlr4\\Runtime\\Atn\\ATNDeserializer;
 use Antlr\\Antlr4\\Runtime\\Atn\\LexerATNSimulator;
 use Antlr\\Antlr4\\Runtime\\Lexer;
 use Antlr\\Antlr4\\Runtime\\CharStream;
 use Antlr\\Antlr4\\Runtime\\PredictionContexts\\PredictionContextCache;
 use Antlr\\Antlr4\\Runtime\\RuleContext;
 use Antlr\\Antlr4\\Runtime\\Atn\\ATN;
 use Antlr\\Antlr4\\Runtime\\Dfa\\DFA;
 use Antlr\\Antlr4\\Runtime\\Vocabulary;
 use Antlr\\Antlr4\\Runtime\\RuntimeMetaData;
 use Antlr\\Antlr4\\Runtime\\VocabularyImpl;
<if(namedActions.definitions)><namedActions.definitions><endif>

 final class <lexer.name> extends <superClass; null="Lexer">
 {
 <if(lexer.tokens)>
 public const <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>


 <if(lexer.channels)>
 public const <lexer.channels:{c | <c> = <lexer.channels.(c)>}; separator=", ", wrap, anchor>;
```

```
    <endif>

    <if(rest(lexer.modes))>
    public const <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
    <endif>

    /**
     * @var array\<string>
     */
    public const CHANNEL_NAMES = [
     'DEFAULT_TOKEN_CHANNEL', 'HIDDEN'<if (lexer.channels)>, <lexer.channels:{c| '<c>'}; separator=", ",
wrap, anchor><endif>
    ];

    /**
     * @var array\<string>
     */
    public const MODE_NAMES = [
     <lexer.modes:{m| '<m>'}; separator=", ", wrap, anchor>
    ];

    /**
     * @var array\<string>
     */
    public const RULE_NAMES = [
     <lexer.ruleNames:{r | '<r>'}; separator=", ", wrap, anchor>
    ];

    <vocabulary(lexer.literalNames, lexer.symbolicNames)>

    <atn>
    protected static $atn;
    protected static $decisionToDFA;
    protected static $sharedContextCache;
<if(namedActions.members)>

    <namedActions.members>
<endif>

    public function __construct(CharStream $input)
    {
     parent::__construct($input);

     self::initialize();

     $this->interp = new LexerATNSimulator($this, self::$atn, self::$decisionToDFA, self::$sharedContextCache);
    }
```

```php
private static function initialize() : void
{
 if (self::$atn !== null) {
  return;
 }

 RuntimeMetaData::checkVersion('<lexerFile.ANTLRVersion>', RuntimeMetaData::VERSION);

 $atn = (new ATNDeserializer())->deserialize(self::SERIALIZED_ATN);

 $decisionToDFA = [];
 for ($i = 0, $count = $atn->getNumberOfDecisions(); $i \< $count; $i++) {
  $decisionToDFA[] = new DFA($atn->getDecisionState($i), $i);
 }

 self::$atn = $atn;
 self::$decisionToDFA = $decisionToDFA;
 self::$sharedContextCache = new PredictionContextCache();
}

public static function vocabulary() : Vocabulary
{
 static $vocabulary;

 return $vocabulary = $vocabulary ?? new VocabularyImpl(self::LITERAL_NAMES, self::SYMBOLIC_NAMES);
}

public function getGrammarFileName() : string
{
 return '<lexer.grammarFileName>';
}

public function getRuleNames() : array
{
 return self::RULE_NAMES;
}

public function getSerializedATN() : string
{
 return self::SERIALIZED_ATN;
}

/**
 * @return array\<string>
 */
public function getChannelNames() : array
{
 return self::CHANNEL_NAMES;
```

```
    }

    /**
     * @return array\<string>
     */
    public function getModeNames() : array
    {
     return self::MODE_NAMES;
    }

    public function getATN() : ATN
    {
     return self::$atn;
    }

    public function getVocabulary() : Vocabulary
    {
     return self::vocabulary();
    }
    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
    }
}
>>


SerializedATN(model) ::= <<
<if(rest(model.segments))>
/**
 * @var string
 */
private const SERIALIZED_ATN =
 <model.segments:{segment| "<segment; wrap={" .<\n>"}>"}; separator=" .\n">;
<else>
/**
 * @var string
 */
private const SERIALIZED_ATN =
 "<model.serialized; wrap={" .<\n>    "}>";
<endif>
>>


/**
 * Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is `null`.
 */
initValue(typeName) ::= <<
<phpTypeInitMap.(typeName)>
>>
```

codeFileExtension() ::= ".php"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/PHP/PHP.stg
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```
/*
* Copyright (c) 2012-2017 The ANTLR Project. All rights reserved.
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* can be found in the LICENSE.txt file in the project root.
*/
/**
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 */
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/gui/GraphicsSupport.java
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```
/*
[The "BSD licence"]
Copyright (c) 2006 Kay Roepke
```

/*
This file contains the actual layout of the messages emitted by ANTLR.
The text itself is coming out of the languages/*stg files, according to the chosen locale.
This file contains the format that mimicks GCC output.
*/

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "<text> [error <id>]"

report(location, message, type) ::= "<location> <type>: <message>"

wantsSingleLineMessage() ::= "true"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/messages/formats/gnu.stg
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 */
```

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* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/Cpp/Files.stg
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 *
 *  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
```

```
/** Find left-recursive rules */
tree grammar LeftRecursiveRuleWalker;

options {
 tokenVocab=ANTLRParser;
   ASTLabelType=GrammarAST;
}

@header {
package org.antlr.v4.parse;

import org.antlr.v4.misc.*;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
private String ruleName;
private int currentOuterAltNumber; // which outer alt of rule?
public int numAlts;  // how many alts for this rule total?

public void setAltAssoc(AltAST altTree, int alt) {}
public void binaryAlt(AltAST altTree, int alt) {}
public void prefixAlt(AltAST altTree, int alt) {}
public void suffixAlt(AltAST altTree, int alt) {}
public void otherAlt(AltAST altTree, int alt) {}
public void setReturnValues(GrammarAST t) {}
}

@rulecatch { }

// TODO: can get parser errors for not matching pattern; make them go away
public
rec_rule returns [boolean isLeftRec]
@init
{
 currentOuterAltNumber = 1;
```

```
    }
  : ^( r=RULE id=RULE_REF {ruleName=$id.getText();}
    ruleModifier?
//  (ARG_ACTION)? shouldn't allow args, right?
    (^(RETURNS a=ARG_ACTION {setReturnValues($a);}))?
//      ( ^(THROWS .+) )? don't allow
      ( ^(LOCALS ARG_ACTION) )? // TODO: copy these to gen'd code
      ( ^(OPTIONS .*)
      | ^(AT ID ACTION) // TODO: copy
      )*
    ruleBlock {$isLeftRec = $ruleBlock.isLeftRec;}
    exceptionGroup
  )
  ;

exceptionGroup
  : exceptionHandler* finallyClause?
  ;

exceptionHandler
 : ^(CATCH ARG_ACTION ACTION)
 ;

finallyClause
 : ^(FINALLY ACTION)
 ;

ruleModifier
  : PUBLIC
  | PRIVATE
  | PROTECTED
  ;

ruleBlock returns [boolean isLeftRec]
@init{boolean lr=false; this.numAlts = $start.getChildCount();}
 : ^( BLOCK
   (
    o=outerAlternative
    {if ($o.isLeftRec) $isLeftRec = true;}
    {currentOuterAltNumber++;}
   )+
  )
 ;

/** An alt is either prefix, suffix, binary, or ternary operation or "other" */
outerAlternative returns [boolean isLeftRec]
   : (binary)=>       binary
                   {binaryAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
```

```
    |  (prefix)=>        prefix
                    {prefixAlt((AltAST)$start, currentOuterAltNumber);}
    |  (suffix)=>        suffix
                    {suffixAlt((AltAST)$start, currentOuterAltNumber); $isLeftRec=true;}
    |  nonLeftRecur       {otherAlt((AltAST)$start,  currentOuterAltNumber);}
    ;


binary
 : ^( ALT elementOptions? recurse element* recurse epsilonElement* )
     {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;


prefix
 : ^( ALT elementOptions?
   element+
   recurse epsilonElement*
   )
     {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
 ;


suffix
   :  ^( ALT elementOptions? recurse element+ )
     {setAltAssoc((AltAST)$ALT,currentOuterAltNumber);}
   ;


nonLeftRecur
   :  ^(ALT elementOptions? element+)
   ;


recurse
 : ^(ASSIGN ID recurseNoLabel)
 | ^(PLUS_ASSIGN ID recurseNoLabel)
 | recurseNoLabel
 ;


recurseNoLabel : {((CommonTree)input.LT(1)).getText().equals(ruleName)}? RULE_REF;


token returns [GrammarAST t=null]
 : ^(ASSIGN ID s=token {$t = $s.t;})
 | ^(PLUS_ASSIGN ID s=token {$t = $s.t;})
 | b=STRING_LITERAL        {$t = $b;}
   | ^(b=STRING_LITERAL elementOptions)  {$t = $b;}
   | ^(c=TOKEN_REF elementOptions)   {$t = $c;}
 | c=TOKEN_REF          {$t = $c;}
 ;


elementOptions
   : ^(ELEMENT_OPTIONS elementOption*)
```

```
  ;

elementOption
  : ID
  | ^(ASSIGN ID ID)
  | ^(ASSIGN ID STRING_LITERAL)
  | ^(ASSIGN ID ACTION)
  | ^(ASSIGN ID INT)
  ;

element
 : atom
 | ^(NOT element)
 | ^(RANGE atom atom)
 | ^(ASSIGN ID element)
 | ^(PLUS_ASSIGN ID element)
  | ^(SET setElement+)
  |  RULE_REF
 | ebnf
 | epsilonElement
 ;

epsilonElement
 : ACTION
 | SEMPRED
 | EPSILON
 | ^(ACTION elementOptions)
 | ^(SEMPRED elementOptions)
 ;

setElement
 : ^(STRING_LITERAL elementOptions)
 | ^(TOKEN_REF elementOptions)
 | STRING_LITERAL
 | TOKEN_REF
 ;

ebnf:  block
  | ^( OPTIONAL block )
  | ^( CLOSURE block )
  | ^( POSITIVE_CLOSURE block )
  ;

block
  : ^(BLOCK ACTION? alternative+)
  ;

alternative
```

```
  : ^(ALT elementOptions? element+)
  ;

atom
 : ^(RULE_REF ARG_ACTION? elementOptions?)
   | ^(STRING_LITERAL elementOptions)
 | STRING_LITERAL
   | ^(TOKEN_REF elementOptions)
 | TOKEN_REF
   | ^(WILDCARD elementOptions)
 | WILDCARD
 | ^(DOT ID element)
 ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/parse/LeftRecursiveRuleWalker.g
No license file was found, but licenses were detected in source scan.

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/templates/codegen/Cpp/Cpp.stg
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 *  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

atn(startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph ATN {
rankdir=LR;
<decisionRanks; separator="\n">
<states; separator="\n">
<edges; separator="\n">
}
>>

dfa(name, startState, states, edges, rankdir, decisionRanks, useBox) ::= <<
digraph <name>  {
<if(rankdir)>rankdir=<rankdir>;<endif>
<decisionRanks; separator="\n">
```

```
<states; separator="\n">
<edges; separator="\n">
}
>>

decision-rank(states) ::= <<
{rank=same; rankdir=TB; <states:{s | s<s>}; separator="; ">}
>>

edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

action-edge(src,target,label,arrowhead,transitionIndex) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontsize=11, fontname="Courier", arrowsize=.7,
label = "<label>"<if(arrowhead)>, arrowhead = <arrowhead><endif>];
>>

epsilon-edge(src,label,target,arrowhead,transitionIndex,loopback=false) ::= <<
<src><if(transitionIndex)>:p<transitionIndex><endif> -> <target> [fontname="Times-Italic",
label="&epsilon;"<if(loopback)>, style="dashed"<endif>];
>>

state(state, label, name, transitions) ::= <%
<name>[fontsize=11,
  label="
    <! rest(transition) tests for decision states: these nodes have a non-empty set of transitions after the first one. !>
    <if(rest(transitions))>
      {
      <! Label on the left side of the record node. !>
      <label>
      |
      <! Named ports in order on right side of record node, no display text. !>
      {<transitions:{t|\<p<i0>>}; separator="|">}}
    <else>
      <label>
    <endif>
    "
  <if(rest(transitions))>
    , shape=record, fixedsize=false
  <else>
    , shape=circle, fixedsize=true, width=.55
  <endif>
  , peripheries=1];
%>

stopstate(name,label,actionIndex,useBox) ::= <<
```

```
<name>[fontsize=11, label="<label><if(actionIndex)>,\naction:<actionIndex><endif>",
<if(useBox)>shape=polygon,sides=4,peripheries=2,fixedsize=false<else>shape=doublecircle, fixedsize=true,
width=.6<endif>];
>>
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/dot/graphs.stg
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```
/*
This file contains the actual layout of the messages emitted by ANTLR.
This file contains the default format ANTLR uses.
*/

location(file, line, column) ::= "<file>:<line>:<column>:"

message(id, text) ::= "(<id>) <text>"

report(location, message, type) ::= "<type>(<message.id>): <location> <message.text>"
```

wantsSingleLineMessage() ::= "false"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/messages/formats/antlr.stg
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 */

tree grammar ATNBuilder;
options {
 language    = Java;
 tokenVocab   = ANTLRParser;
 ASTLabelType = GrammarAST;
// filter     = true;
}

// Include the copyright in this source and also the generated source
@header {
/*
```

```
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
import org.antlr.v4.automata.ATNFactory;
}

@members {
  ATNFactory factory;
  public ATNBuilder(TreeNodeStream input, ATNFactory factory) {
   this(input);
   this.factory = factory;
   }
}

dummy : block[null] ; // avoid error about no start rule

ruleBlock[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {
  List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();
  int alt = 1;
  factory.setCurrentOuterAlt(alt);
}
  : ^(BLOCK
        (^(OPTIONS .*))?
```

```
        (   a=alternative
            {alts.add($a.p); factory.setCurrentOuterAlt(++alt);}
        )+
    )
  {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;


block[GrammarAST ebnfRoot] returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> alts = new ArrayList<ATNFactory.Handle>();}
  : ^(BLOCK (^(OPTIONS .*))? (a=alternative {alts.add($a.p);})+)
    {$p = factory.block((BlockAST)$BLOCK, ebnfRoot, alts);}
  ;


alternative returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> els = new ArrayList<ATNFactory.Handle>();}
  : ^(LEXER_ALT_ACTION a=alternative lexerCommands)
      {$p = factory.lexerAltCommands($a.p,$lexerCommands.p);}
  | ^(ALT elementOptions? EPSILON)      {$p = factory.epsilon($EPSILON);}
  |  ^(ALT elementOptions? (e=element {els.add($e.p);})+) {$p = factory.alt(els);}
  ;


lexerCommands returns [ATNFactory.Handle p]
@init {List<ATNFactory.Handle> cmds = new ArrayList<ATNFactory.Handle>();}
  :  (c=lexerCommand {if ($c.cmd != null) cmds.add($c.cmd);})+
     {
     $p = factory.alt(cmds);
     }
  ;


lexerCommand returns [ATNFactory.Handle cmd]
 : ^(LEXER_ACTION_CALL ID lexerCommandExpr)
     {$cmd = factory.lexerCallCommand($ID, $lexerCommandExpr.start);}
 | ID
     {$cmd = factory.lexerCommand($ID);}
 ;


lexerCommandExpr
 : ID
 | INT
 ;


element returns [ATNFactory.Handle p]
 : labeledElement    {$p = $labeledElement.p;}
 | atom      {$p = $atom.p;}
 | subrule      {$p = $subrule.p;}
 |  ACTION      {$p = factory.action((ActionAST)$ACTION);}
 |  SEMPRED     {$p = factory.sempred((PredAST)$SEMPRED);}
 |  ^(ACTION .)    {$p = factory.action((ActionAST)$ACTION);}
```

```
|  ^(SEMPRED .)    {$p = factory.sempred((PredAST)$SEMPRED);}
 | ^(NOT b=blockSet[true])  {$p = $b.p;}
 | LEXER_CHAR_SET   {$p = factory.charSetLiteral($start);}
;

astOperand returns [ATNFactory.Handle p]
 : atom     {$p = $atom.p;}
 | ^(NOT blockSet[true])  {$p = $blockSet.p;}
 ;

labeledElement returns [ATNFactory.Handle p]
 : ^(ASSIGN ID element)     {$p = factory.label($element.p);}
 | ^(PLUS_ASSIGN ID element)   {$p = factory.listLabel($element.p);}
 ;

subrule returns [ATNFactory.Handle p]
 : ^(OPTIONAL block[$start])   {$p = $block.p;}
 | ^(CLOSURE block[$start])   {$p = $block.p;}
 | ^(POSITIVE_CLOSURE block[$start]) {$p = $block.p;}
 | block[null]      {$p = $block.p;}
  ;

blockSet[boolean invert] returns [ATNFactory.Handle p]
@init {List<GrammarAST> alts = new ArrayList<GrammarAST>();}
 : ^(SET (setElement {alts.add($setElement.start);})+) {$p = factory.set($start, alts, $invert);}
 ;

/** Don't combine with atom otherwise it will build spurious ATN nodes */
setElement
 : ^(STRING_LITERAL .)
 | ^(TOKEN_REF .)
 | STRING_LITERAL
 | TOKEN_REF
 | ^(RANGE a=STRING_LITERAL b=STRING_LITERAL)
  |  LEXER_CHAR_SET
 ;

atom returns [ATNFactory.Handle p]
 : range     {$p = $range.p;}
 | ^(DOT ID terminal)  {$p = $terminal.p;}
 | ^(DOT ID ruleref)  {$p = $ruleref.p;}
  | ^(WILDCARD .)   {$p = factory.wildcard($start);}
  | WILDCARD    {$p = factory.wildcard($start);}
  | blockSet[false]   {$p = $blockSet.p;}
  | terminal    {$p = $terminal.p;}
  | ruleref     {$p = $ruleref.p;}
  ;
```

```
ruleref returns [ATNFactory.Handle p]
  : ^(RULE_REF ARG_ACTION? ^(ELEMENT_OPTIONS .*))  {$p = factory.ruleRef($RULE_REF);}
  | ^(RULE_REF ARG_ACTION?)       {$p = factory.ruleRef($RULE_REF);}
  | RULE_REF          {$p = factory.ruleRef($RULE_REF);}
  ;

range returns [ATNFactory.Handle p]
  : ^(RANGE a=STRING_LITERAL b=STRING_LITERAL) {$p = factory.range($a,$b);}
  ;

terminal returns [ATNFactory.Handle p]
  : ^(STRING_LITERAL .)   {$p = factory.stringLiteral((TerminalAST)$start);}
  | STRING_LITERAL    {$p = factory.stringLiteral((TerminalAST)$start);}
  | ^(TOKEN_REF ARG_ACTION .) {$p = factory.tokenRef((TerminalAST)$start);}
  | ^(TOKEN_REF .)    {$p = factory.tokenRef((TerminalAST)$start);}
  | TOKEN_REF     {$p = factory.tokenRef((TerminalAST)$start);}
  ;

elementOptions
  : ^(ELEMENT_OPTIONS elementOption*)
  ;

elementOption
 : ID
 | ^(ASSIGN ID ID)
 | ^(ASSIGN ID STRING_LITERAL)
 | ^(ASSIGN ID ACTION)
 | ^(ASSIGN ID INT)
 ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ATNBuilder.g
No license file was found, but licenses were detected in source scan.

```
// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using System.Diagnostics;
using System.Collections.Generic;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using DFA = Antlr4.Runtime.Dfa.DFA;

<parser>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
```

```
using IParseTreeListener = Antlr4.Runtime.Tree.IParseTreeListener;
using IToken = Antlr4.Runtime.IToken;

/// \<summary>
/// This interface defines a complete listener for a parse tree produced by
/// \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Listener : IParseTreeListener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

BaseListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>

using Antlr4.Runtime.Misc;
using IErrorNode = Antlr4.Runtime.Tree.IErrorNode;
```

```
using ITerminalNode = Antlr4.Runtime.Tree.ITerminalNode;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;


/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Listener"/>,
/// which can be extended to create a listener which only needs to handle a subset
/// of the available methods.
/// \</summary>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseListener : I<file.grammarName>Listener {
 <file.listenerNames:{lname |
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Enter a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Enter a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Enter<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}
/// \<summary>
<if(file.listenerLabelRuleNames.(lname))>
/// Exit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.listenerLabelRuleNames.(lname)>"/>.
<else>
/// Exit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>The default implementation does nothing.\</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
public virtual void Exit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { \}}; separator="\n">


 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void EnterEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void ExitEveryRule([NotNull] ParserRuleContext context) { }
 /// \<inheritdoc/>
 /// \<remarks>The default implementation does nothing.\</remarks>
 public virtual void VisitTerminal([NotNull] ITerminalNode node) { }
 /// \<inheritdoc/>
```

```
    /// \<remarks>The default implementation does nothing.\</remarks>
    public virtual void VisitErrorNode([NotNull] IErrorNode node) { }
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;


/// \<summary>
/// This interface defines a complete generic visitor for a parse tree produced
/// by \<see cref="<csIdentifier.(file.parserName)>"/>.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public interface I<file.grammarName>Visitor\<Result> : IParseTreeVisitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c>\<lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname; format="cap">Context
context);}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


BaseVisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
```

```
namespace <file.genPackage> {
<endif>
<header>
using Antlr4.Runtime.Misc;
using Antlr4.Runtime.Tree;
using IToken = Antlr4.Runtime.IToken;
using ParserRuleContext = Antlr4.Runtime.ParserRuleContext;

/// \<summary>
/// This class provides an empty implementation of \<see cref="I<file.grammarName>Visitor{Result}"/>,
/// which can be extended to create a visitor which only needs to handle a subset
/// of the available methods.
/// \</summary>
/// \<typeparam name="Result">The return type of the visit operation.\</typeparam>
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <file.grammarName>BaseVisitor\<Result> : AbstractParseTreeVisitor\<Result>,
I<file.grammarName>Visitor\<Result> {
 <file.visitorNames:{lname |
/// \<summary>
<if(file.visitorLabelRuleNames.(lname))>
/// Visit a parse tree produced by the \<c><lname>\</c>
/// labeled alternative in \<see cref="<file.parserName>.<file.visitorLabelRuleNames.(lname)>"/>.
<else>
/// Visit a parse tree produced by \<see cref="<file.parserName>.<lname>"/>.
<endif>
/// \<para>
/// The default implementation returns the result of calling \<see
cref="AbstractParseTreeVisitor{Result\}.VisitChildren(IRuleNode)"/>
/// on \<paramref name="context"/>.
/// \</para>
/// \</summary>
/// \<param name="context">The parse tree.\</param>
/// \<return>The visitor result.\</return>
public virtual Result Visit<lname; format="cap">([NotNull] <csIdentifier.(file.parserName)>.<lname;
format="cap">Context context) { return VisitChildren(context); \}}; separator="\n">
}
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
//------------------------------------------------------------------------------
// \<auto-generated>
//     This code was generated by a tool.
//     ANTLR Version: <ANTLRVersion>
//
```

```
//     Changes to this file may cause incorrect behavior and will be lost if
//     the code is regenerated.
// \</auto-generated>
//------------------------------------------------------------------------------

// Generated from <grammarFileName> by ANTLR <ANTLRVersion>

// Unreachable code detected
#pragma warning disable 0162
// The variable '...' is assigned but its value is never used
#pragma warning disable 0219
// Missing XML comment for publicly visible type or member '...'
#pragma warning disable 1591
// Ambiguous reference in cref attribute
#pragma warning disable 419

>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(parser.name)> : <superClass; null="Parser"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
 <if(parser.tokens)>
 public const int
  <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator=", ", wrap, anchor>;
 <endif>
 public const int
  <parser.rules:{r | RULE_<r.name> = <r.index>}; separator=", ", wrap, anchor>;
 public static readonly string[] ruleNames = {
  <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
 };

 <vocabulary(parser.literalNames, parser.symbolicNames)>

 public override string GrammarFileName { get { return "<parser.grammarFileName>"; } }

 public override string[] RuleNames { get { return ruleNames; } }

 public override string SerializedAtn { get { return new string(_serializedATN); } }

 static <csIdentifier.(parser.name)>() {
  decisionToDFA = new DFA[_ATN.NumberOfDecisions];
```

```
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }

 <namedActions.members>
 <parser:(ctor)()>
 <funcs; separator="\n">

<if(sempredFuncs)>
 public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
  switch (ruleIndex) {
  <parser.sempredFuncs.values:{f|
case <f.ruleIndex>: return <f.name>_sempred((<f.ctxType>)_localctx, predIndex);}; separator="\n">
  }
  return true;
 }
 <sempredFuncs.values; separator="\n">
<endif>

 <atn>
 }
>>


vocabulary(literalNames, symbolicNames) ::= <<
private static readonly string[] _LiteralNames = {
 <literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
private static readonly string[] _SymbolicNames = {
 <symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor>
};
public static readonly IVocabulary DefaultVocabulary = new Vocabulary(_LiteralNames, _SymbolicNames);

[NotNull]
public override IVocabulary Vocabulary
{
 get
 {
  return DefaultVocabulary;
 }
}
>>


dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
public override void Action(RuleContext _localctx, int ruleIndex, int actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
```

```
case <f.ruleIndex> : <f.name>_action(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, actionIndex); break;};
separator="\n">
 }
}
<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
public override bool Sempred(RuleContext _localctx, int ruleIndex, int predIndex) {
 switch (ruleIndex) {
 <recog.sempredFuncs.values:{f|
case <f.ruleIndex> : return <f.name>_sempred(<if(!recog.modes)>(<f.ctxType>)<endif>_localctx, predIndex);};
separator="\n">
 }
 return true;
 }
<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(parser) ::= <<
 public <csIdentifier.(parser.name)>(ITokenStream input) : this(input, Console.Out, Console.Error) { }

 public <csIdentifier.(parser.name)>(ITokenStream input, TextWriter output, TextWriter errorOutput)
 : base(input, output, errorOutput)
{
 Interpreter = new ParserATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
 }
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<
private void <r.name>_action(<r.ctxType> _localctx, int actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>: <actions.(index)> break;}; separator="\n">
 }
 }
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
private bool <r.name>_sempred(<r.ctxType> _localctx, int predIndex) {
 switch (predIndex) {
 <actions:{index|
```

```
case <index>: return <actions.(index)>;}; separator="\n">
 }
 return true;
 }
 >>

 RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
 ::= <<

 <if(ruleCtx)>
 <ruleCtx>
 <endif>
 <altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

 [RuleVersion(<namedActions.version; null="0">)]
 <if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
 <csIdentifier.(currentRule.name)>(<args; separator=", ">) {
  <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
 <csIdentifier.(a.name)>}>);
  EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
 <if(currentRule.hasLookaheadBlock)>
  int _alt;
 <endif>
   <code>
   <postamble; separator="\n">
   <namedActions.after>
  }
  <if(exceptions)>
 <exceptions; separator="\n">
  <else>
  catch (RecognitionException re) {
   _localctx.exception = re;
   ErrorHandler.ReportError(this, re);
   ErrorHandler.Recover(this, re);
  }
  <endif>
  finally {
   <finallyAction>
   ExitRule();
  }
  return _localctx;
 }
 >>

 LeftFactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
```

```
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterLeftFactoredRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
 finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
}
>>

// This behaves similar to RuleFunction (enterRule is called, and no adjustments
// are made to the parse tree), but since it's still a variant no context class
// needs to be generated.
LeftUnfactoredRuleFunction(currentRule,args,code,locals,namedActions,finallyAction,postamble) ::=
<<

<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>private <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, State<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 EnterRule(_localctx, <currentRule.startState>, RULE_<currentRule.variantOf>);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
```

```
  <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
 _localctx.exception = re;
 ErrorHandler.ReportError(this, re);
 ErrorHandler.Recover(this, re);
 }
 finally {
 <finallyAction>
 ExitRule();
 }
 return _localctx;
 }
>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

[RuleVersion(<namedActions.version; null="0">)]
<if(currentRule.modifiers)><currentRule.modifiers:{f | <f> }><else>public <endif><currentRule.ctxType>
<csIdentifier.(currentRule.name)>(<args; separator=", ">) {
 return <csIdentifier.(currentRule.name)>(0<currentRule.args:{a | , <csIdentifier.(a.name)>}>);
 }

private <currentRule.ctxType> <csIdentifier.(currentRule.name)>(int _p<args:{a | , <a>}>) {
 ParserRuleContext _parentctx = Context;
 int _parentState = State;
 <currentRule.ctxType> _localctx = new <currentRule.ctxType>(Context, _parentState<currentRule.args:{a | ,
<csIdentifier.(a.name)>}>);
 <currentRule.ctxType> _prevctx = _localctx;
 int _startState = <currentRule.startState>;
 EnterRecursionRule(_localctx, <currentRule.startState>, RULE_<currentRule.name>, _p);
 <namedActions.init>
 <locals; separator="\n">
 try {
<if(currentRule.hasLookaheadBlock)>
 int _alt;
<endif>
 <code>
 <postamble; separator="\n">
 <namedActions.after>
 }
 catch (RecognitionException re) {
```

```
  _localctx.exception = re;
  ErrorHandler.ReportError(this, re);
  ErrorHandler.Recover(this, re);
 }
 finally {
  <finallyAction>
  UnrollRecursionContexts(_parentctx);
 }
 return _localctx;
}
>>

CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>_localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(_localctx);<endif>
EnterOuterAlt(_localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>

CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
{
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
}
>>

LL1AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 <error>
}
>>

LL1OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch (TokenStream.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
```

```
default:
 break;
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
if (<expr>) {
 <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
>>


LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<preamble; separator="\n">
while (<loopExpr>) {
 <alts; separator="\n">
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 <iteration>
}
>>


LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
<preamble; separator="\n">
do {
 <alts; separator="\n">
 State = <choice.stateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 <iteration>
} while ( <loopExpr> );
>>


// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
<if(choice.label)><labelref(choice.label)> = TokenStream.LT(1);<endif>
<preamble; separator="\n">
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
```

```
case <i>:
 <alt>
 break;}; separator="\n">
}
>>


OptionalBlock(choice, alts, error) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
switch ( Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context) ) {
<alts:{alt |
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
State = <choice.stateNumber>;
ErrorHandler.Sync(this);
_alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER ) {
 if ( _alt==1<if(!choice.ast.greedy)>+1<endif> ) {
  <iteration>
  <alts> <! should only be one !>
 }
 State = <choice.loopBackStateNumber>;
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
}
>>


PlusBlock(choice, alts, error) ::= <<
State = <choice.blockStartStateNumber>;<! alt block decision !>
ErrorHandler.Sync(this);
_alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 State = <choice.loopBackStateNumber>;<! loopback/exit decision !>
 ErrorHandler.Sync(this);
 _alt = Interpreter.AdaptivePredict(TokenStream,<choice.decision>,Context);
```

```
} while ( _alt!=<choice.exitAlt> && _alt!=global::Antlr4.Runtime.Atn.ATN.INVALID_ALT_NUMBER );
>>


Sync(s) ::= "Sync(<s.expecting.name>);"


ThrowNoViableAlt(t) ::= "throw new NoViableAltException(this);"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShift(s.varName, bits.shift)>})> && ((1L \<\< <offsetShift(s.varName, bits.shift)>) &
(<bits.ttypes:{ttype | (1L \<\< <offsetShift(tokenType.(ttype), bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShift(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<tokenType.(ttype)>}; separator=" || ">
%>


cases(ttypes) ::= <<
<ttypes:{t | case <tokenType.(t)>:}; separator="\n">
>>


InvokeRule(r, argExprsChunks) ::= <<
State = <r.stateNumber>; <if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif><csIdentifier.(r.name)>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><arg
ExprsChunks>);
>>


MatchToken(m) ::= <<
```

```
State = <m.stateNumber>; <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>Match(<tokenType.(m.name)>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
State = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>TokenStream.LT(1);<endif>
<capture>
if ( <if(invert)><m.varName> \<= 0 || <else>!<endif>(<expr>) ) {
 <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>ErrorHandler.RecoverInline(this);
}
else {
 ErrorHandler.ReportMatch(this);
   Consume();
}
>>

Wildcard(w) ::= <<
State = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>MatchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
State = <p.stateNumber>;
if (!(<chunks>)) throw new FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()  ::= "Skip();"
LexerMoreCommand()  ::= "More();"
LexerPopModeCommand() ::= "PopMode();"
```

LexerTypeCommand(arg, grammar)   ::= "_type = <tokenType.(arg)>;"
LexerChannelCommand(arg, grammar)   ::= "_channel = <channelName.(arg)>;"
LexerModeCommand(arg, grammar)   ::= "_mode = <modeName.(arg)>;"
LexerPushModeCommand(arg, grammar) ::= "PushMode(<modeName.(arg)>);"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
LocalRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
RetValueRef(a) ::= "_localctx.<csIdentifier.(a.name)>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<csIdentifier.(a.name)>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<csIdentifier.(tokenType.(t.name))>"
LabelRef(t) ::= "<ctx(t)>.<csIdentifier.(t.name)>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(csIdentifier.(t.name))>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<csIdentifier.(s.name)> = <rhsChunks>;"

TokenLabelType() ::= "<file.TokenLabelType; null={IToken}>"
InputSymbolType() ::= "<file.InputSymbolType; null={IToken}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Text:null)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Type:0)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Line:0)"
TokenPropertyRef_pos(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.CharPositionInLine:0)"
TokenPropertyRef_channel(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.Channel:0)"
TokenPropertyRef_index(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?<ctx(t)>.<tokenType.(t.label)>.TokenIndex:0)"
TokenPropertyRef_int(t) ::=
"(<ctx(t)>.<tokenType.(t.label)>!=null?int.Parse(<ctx(t)>.<tokenType.(t.label)>.Text):0)"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Start):null)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>!=null?(<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_text(r) ::=
"(<ctx(r)>.<r.label>!=null?TokenStream.GetText(<ctx(r)>.<r.label>.Start,<ctx(r)>.<r.label>.Stop):null)"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "_localctx.Start"
ThisRulePropertyRef_stop(r) ::= "_localctx.Stop"
ThisRulePropertyRef_text(r) ::= "TokenStream.GetText(_localctx.Start, TokenStream.LT(-1))"
ThisRulePropertyRef_ctx(r) ::= "_localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= <%((<s.ruleName;
format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)>%>

SetNonLocalAttr(s, rhsChunks)   ::=
 <%((<s.ruleName; format="cap">Context)GetInvokingContext(<s.ruleIndex>)).<csIdentifier.(s.name)> =
<rhsChunks>;%>

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.Add(<labelref(a.label)>);"

TokenDecl(t) ::= "<TokenLabelType()> <csIdentifier.(tokenType.(t.name))>"
TokenTypeDecl(t) ::= "int <csIdentifier.(tokenType.(t.name))>;"
TokenListDecl(t) ::= "IList\<IToken> <csIdentifier.(tokenType.(t.name))> = new List\<IToken>()"
RuleContextDecl(r) ::= "<r.ctxName> <csIdentifier.(r.name)>"
RuleContextListDecl(rdecl) ::= "IList\<<rdecl.ctxName>> <csIdentifier.(rdecl.name)> = new
List\<<rdecl.ctxName>>()"

contextGetterCollection(elementType) ::= <%
<elementType>[]
%>

ContextTokenGetterDecl(t)   ::=
   "public ITerminalNode <csIdentifier.(tokenType.(t.name))>() { return
GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, 0); }"
ContextTokenListGetterDecl(t) ::= <<
public <contextGetterCollection("ITerminalNode")> <csIdentifier.(tokenType.(t.name))>() { return
GetTokens(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>); }
>>
ContextTokenListIndexedGetterDecl(t) ::= <<
public ITerminalNode <csIdentifier.(tokenType.(t.name))>(int i) {
 return GetToken(<csIdentifier.(parser.name)>.<csIdentifier.(tokenType.(t.name))>, i);
}
>>
ContextRuleGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>() {
 return GetRuleContext\<<r.ctxName>\>(0);
}
>>
ContextRuleListGetterDecl(r)   ::= <<
public <contextGetterCollection({<r.ctxName>})> <csIdentifier.(r.name)>() {
 return GetRuleContexts\<<r.ctxName>\>();
}
>>
ContextRuleListIndexedGetterDecl(r)   ::= <<
public <r.ctxName> <csIdentifier.(r.name)>(int i) {
 return GetRuleContext\<<r.ctxName>\>(i);
}
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,

```
* r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"


ImplicitTokenLabel(tokenName) ::= "_<tokenType.(tokenName)>"
ImplicitRuleLabel(ruleName)  ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "_<label>"


CaptureNextToken(d) ::= "<d.varName> = TokenStream.LT(1);"
CaptureNextTokenType(d) ::= "<d.varName> = TokenStream.LA(1);"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers,
       superClass={ParserRuleContext}) ::= <<
public partial class <struct.name> :
<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif><if(interfaces)>, <interfaces;
separator=", "><endif> {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 <if(ctorAttrs)>public <struct.name>(ParserRuleContext parent, int invokingState) : base(parent, invokingState) {
}<endif>
 public <struct.name>(ParserRuleContext parent, int invokingState<ctorAttrs:{a | , <a>}>)
 : base(parent, invokingState)
 {
 <struct.ctorAttrs:{a | this.<csIdentifier.(a.name)> = <csIdentifier.(a.name)>;}; separator="\n">
 }
 public override int RuleIndex { get { return RULE_<struct.derivedFromName>; } }
<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
 public <struct.name>() { }
 public virtual void CopyFrom(<struct.name> context) {
 base.CopyFrom(context);
 <struct.attrs:{a | this.<csIdentifier.(a.name)> = context.<csIdentifier.(a.name)>;}; separator="\n">
 }
<endif>
 <dispatchMethods; separator="\n">
 <extensionMembers; separator="\n">
}
>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
public partial class <struct.name> : <currentRule.name; format="cap">Context {
 <attrs:{a | public <a>;}; separator="\n">
 <getters:{g | <g>}; separator="\n">
 public <struct.name>(<currentRule.name; format="cap">Context context) { CopyFrom(context); }
 <dispatchMethods; separator="\n">
}
>>
```

```
ListenerDispatchMethod(method) ::= <<
public override void <if(method.isEnter)>Enter<else>Exit<endif>Rule(IParseTreeListener listener) {
 I<parser.grammarName>Listener typedListener = listener as I<parser.grammarName>Listener;
 if (typedListener != null) typedListener.<if(method.isEnter)>Enter<else>Exit<endif><struct.derivedFromName;
format="cap">(this);
}
>>


VisitorDispatchMethod(method) ::= <<
public override TResult Accept\<TResult>(IParseTreeVisitor\<TResult> visitor) {
 I<parser.grammarName>Visitor\<TResult> typedVisitor = visitor as I<parser.grammarName>Visitor\<TResult>;
 if (typedVisitor != null) return typedVisitor.Visit<struct.derivedFromName; format="cap">(this);
 else return visitor.VisitChildren(this);
}
>>


AttributeDecl(d) ::= "<d.type> <csIdentifier.(d.name)><if(d.initValue)> = <d.initValue><endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)><typedContext(x.ctx)>.<endif><csIdentifier.(x.name)>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "<typedContext(actionChunk.ctx)>"

// only casts _localctx to the type when the cast isn't redundant (i.e. to a sub-context for a labeled alt)
typedContext(ctx) ::= "<if(ctx.provideCopyFrom)>((<ctx.name>)_localctx<else>_localctx<endif>"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "Precpred(Context, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>;"
recRuleSetStopToken()              ::= "Context.Stop = TokenStream.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label, isListLabel) ::= <<
_localctx = new <ctxName>Context(_parentctx, _parentState);
<if(label)>
<if(isListLabel)>
_localctx.<label>.Add(_prevctx);
<else>
_localctx.<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>


recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
_localctx = new <currentAltLabel; format="cap">Context(new <ruleName; format="cap">Context(_parentctx,
_parentState));
<if(label)>
```

```
<if(isListLabel)>
((<currentAltLabel; format="cap">Context)_localctx).<label>.Add(_prevctx);
<else>
((<currentAltLabel; format="cap">Context)_localctx).<label> = _prevctx;
<endif>
<endif>
PushNewRecursionContext(_localctx, _startState, RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
_localctx = new <ctxName>Context(_localctx);
Context = _localctx;
_prevctx = _localctx;
>>

recRuleSetPrevCtx() ::= <<
if ( ParseListeners!=null )
 TriggerExitRuleEvent();
_prevctx = _localctx;
>>


LexerFile(file, lexer, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
<if(file.genPackage)>
namespace <file.genPackage> {
<endif>
<namedActions.header>
using System;
using System.IO;
using System.Text;
using Antlr4.Runtime;
using Antlr4.Runtime.Atn;
using Antlr4.Runtime.Misc;
using DFA = Antlr4.Runtime.Dfa.DFA;

<lexer>
<if(file.genPackage)>
} // namespace <file.genPackage>
<endif>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
[System.CodeDom.Compiler.GeneratedCode("ANTLR", "<file.ANTLRVersion>")]
[System.CLSCompliant(false)]
public partial class <csIdentifier.(lexer.name)> : <superClass; null="Lexer"> {
 protected static DFA[] decisionToDFA;
 protected static PredictionContextCache sharedContextCache = new PredictionContextCache();
```

```
public const int
 <lexer.tokens:{k | <tokenType.(k)>=<lexer.tokens.(k)>}; separator=", ", wrap, anchor>;
<if(lexer.channels)>
public const int
 <lexer.channels:{k | <csIdentifier.(k)>=<lexer.channels.(k)>}; separator=", ", wrap, anchor>;
<endif>
<if(rest(lexer.modes))>
public const int
 <rest(lexer.modes):{m | <m>=<i>}; separator=", ", wrap, anchor>;
<endif>
public static string[] channelNames = {
 "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>, <lexer.channels:{c| "<c>"}; separator=", ",
wrap, anchor><endif>
};

public static string[] modeNames = {
 <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor>
};

public static readonly string[] ruleNames = {
 <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor>
};

<namedActions.members>

public <csIdentifier.(lexer.name)>(ICharStream input)
: this(input, Console.Out, Console.Error) { }

public <csIdentifier.(lexer.name)>(ICharStream input, TextWriter output, TextWriter errorOutput)
: base(input, output, errorOutput)
{
 Interpreter = new LexerATNSimulator(this, _ATN, decisionToDFA, sharedContextCache);
}

<vocabulary(lexer.literalNames, lexer.symbolicNames)>

public override string GrammarFileName { get { return "<lexer.grammarFileName>"; } }

public override string[] RuleNames { get { return ruleNames; } }

public override string[] ChannelNames { get { return channelNames; } }

public override string[] ModeNames { get { return modeNames; } }

public override string SerializedAtn { get { return new string(_serializedATN); } }

static <csIdentifier.(lexer.name)>() {
 decisionToDFA = new DFA[_ATN.NumberOfDecisions];
```

```
  for (int i = 0; i \< _ATN.NumberOfDecisions; i++) {
   decisionToDFA[i] = new DFA(_ATN.GetDecisionState(i), i);
  }
 }
<dumpActions(lexer, "", actionFuncs, sempredFuncs)>
<atn>
}
>>


SerializedATN(model) ::= <<
private static char[] _serializedATN = {
 <model.serialized; separator=", ", wrap>,
};

public static readonly ATN _ATN =
 new ATNDeserializer().Deserialize(_serializedATN);


>>

initValue(typeName) ::= <<
default(<typeName>)
>>

codeFileExtension() ::= ".cs"

modeName ::= [
 "DEFAULT_MODE" : "DefaultMode",
 default : key
]

channelName ::= [
 "HIDDEN" : "Hidden",
 "DEFAULT_TOKEN_CHANNEL" : "DefaultTokenChannel",
 default : key
]

tokenType ::= [
 "EOF" : "Eof",
 default : key
]

csIdentifier ::= [
 "abstract" : "@abstract",
 "as" : "@as",
 "base" : "@base",
 "bool" : "@bool",
```

```
"break" : "@break",
"byte" : "@byte",
"case" : "@case",
"catch" : "@catch",
"char" : "@char",
"checked" : "@checked",
"class" : "@class",
"const" : "@const",
"continue" : "@continue",
"decimal" : "@decimal",
"default" : "@default",
"delegate" : "@delegate",
"do" : "@do",
"double" : "@double",
"else" : "@else",
"enum" : "@enum",
"event" : "@event",
"explicit" : "@explicit",
"extern" : "@extern",
"false" : "@false",
"finally" : "@finally",
"fixed" : "@fixed",
"float" : "@float",
"for" : "@for",
"foreach" : "@foreach",
"goto" : "@goto",
"if" : "@if",
"implicit" : "@implicit",
"in" : "@in",
"int" : "@int",
"interface" : "@interface",
"internal" : "@internal",
"is" : "@is",
"lock" : "@lock",
"long" : "@long",
"namespace" : "@namespace",
"new" : "@new",
"null" : "@null",
"object" : "@object",
"operator" : "@operator",
"out" : "@out",
"override" : "@override",
"params" : "@params",
"private" : "@private",
"protected" : "@protected",
"public" : "@public",
"readonly" : "@readonly",
"ref" : "@ref",
```

```
"return" : "@return",
"sbyte" : "@sbyte",
"sealed" : "@sealed",
"short" : "@short",
"sizeof" : "@sizeof",
"stackalloc" : "@stackalloc",
"static" : "@static",
"string" : "@string",
"struct" : "@struct",
"switch" : "@switch",
"this" : "@this",
"throw" : "@throw",
"true" : "@true",
"try" : "@try",
"typeof" : "@typeof",
"uint" : "@uint",
"ulong" : "@ulong",
"unchecked" : "@unchecked",
"unsafe" : "@unsafe",
"ushort" : "@ushort",
"using" : "@using",
"virtual" : "@virtual",
"values" : "@values",
"void" : "@void",
"volatile" : "@volatile",
"while" : "@while",
default : key
]
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/CSharp/CSharp.stg
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 */

lexer grammar ActionSplitter;

options { filter=true; }

@header {
package org.antlr.v4.parse;
import org.antlr.v4.tool.*;
import org.antlr.v4.tool.ast.*;
}

@members {
ActionSplitterListener delegate;

public ActionSplitter(CharStream input, ActionSplitterListener delegate) {
```

```
      this(input, new RecognizerSharedState());
      this.delegate = delegate;
    }

    /** force filtering (and return tokens). triggers all above actions. */
    public List<Token> getActionTokens() {
      List<Token> chunks = new ArrayList<Token>();
      Token t = nextToken();
      while ( t.getType()!=Token.EOF ) {
          chunks.add(t);
          t = nextToken();
      }
      return chunks;
    }

    private boolean isIDStartChar(int c) {
     return c == '_' || Character.isLetter(c);
    }
    }

// ignore comments right away

COMMENT
  :  '/*' ( options {greedy=false;} : . )* '*/' {delegate.text($text);}
  ;

LINE_COMMENT
  : '//' ~('\n'|'\r')* '\r'? '\n' {delegate.text($text);}
  ;

SET_NONLOCAL_ATTR
 : '$' x=ID '::' y=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
 {
 delegate.setNonLocalAttr($text, $x, $y, $expr);
 }
 ;

NONLOCAL_ATTR
 : '$' x=ID '::' y=ID {delegate.nonLocalAttr($text, $x, $y);}
 ;

QUALIFIED_ATTR
 : '$' x=ID '.' y=ID {input.LA(1)!='('}? {delegate.qualifiedAttr($text, $x, $y);}
 ;

SET_ATTR
 : '$' x=ID WS? '=' expr=ATTR_VALUE_EXPR ';'
 {
```

```
   delegate.setAttr($text, $x, $expr);
  }
 ;


ATTR
 : '$' x=ID {delegate.attr($text, $x);}
 ;


// Anything else is just random text
TEXT
@init {StringBuilder buf = new StringBuilder();}
@after {delegate.text(buf.toString());}
 : ( c=~('\\'| '$') {buf.append((char)$c);}
  | '\\$' {buf.append('$');}
  | '\\' c=~('$') {buf.append('\\').append((char)$c);}
  | {!isIDStartChar(input.LA(2))}? => '$' {buf.append('$');}
  )+
 ;


fragment
ID  : ('a'..'z'|'A'..'Z'|'_') ('a'..'z'|'A'..'Z'|'0'..'9'|'_')*
  ;


/** Don't allow an = as first char to prevent $x == 3; kind of stuff. */
fragment
ATTR_VALUE_EXPR
 : ~'=' (~';')*
 ;


fragment
WS : (' '|'\t'|'\n'|'\r')+
 ;
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ActionSplitter.g
No license file was found, but licenses were detected in source scan.

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*/

/** ANTLR tool checks output templates are compatible with tool code generation.
*  For now, a simple string match used on x.y of x.y.z scheme.
*  Must match Tool.VERSION during load to templates.
*
*  REQUIRED.
*/

pythonTypeInitMap ::= [
 "bool":"False",
 "int":"0",
 "float":"0.0",
 "str":"",
 default:"None" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
# encoding: utf-8
from antlr4 import *
from io import StringIO
import sys
if sys.version_info[1] > 5:
 from typing import TextIO
else:
 from typing.io import TextIO
```

```
<namedActions.header>
<parser>

>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
   from .<file.parserName> import <file.parserName>
else:
   from <file.parserName> import <file.parserName>
<header>

# This class defines a complete listener for a parse tree produced by <file.parserName>.
class <file.grammarName>Listener(ParseTreeListener):

   <file.listenerNames:{lname |
# Enter a parse tree produced by <file.parserName>#<lname>.
def enter<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
   pass

# Exit a parse tree produced by <file.parserName>#<lname>.
def exit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
   pass

}; separator="\n">

del <file.parserName>
>>


VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
from antlr4 import *
if __name__ is not None and "." in __name__:
   from .<file.parserName> import <file.parserName>
else:
   from <file.parserName> import <file.parserName>
<header>

# This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

class <file.grammarName>Visitor(ParseTreeVisitor):

   <file.visitorNames:{lname |
# Visit a parse tree produced by <file.parserName>#<lname>.
def visit<lname; format="cap">(self, ctx:<file.parserName>.<lname; format="cap">Context):
```

```
    return self.visitChildren(ctx)

}; separator="\n">

del <file.parserName>
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
# Generated from <grammarFileName> by ANTLR <ANTLRVersion>
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<Parser_(ctor="parser_ctor", ...)>
>>

Parser_(parser, funcs, atn, sempredFuncs, ctor, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
else:
    from <superClass> import <superClass>

<endif>
<atn>

class <parser.name> ( <if(superClass)><superClass><else>Parser<endif> ):

    grammarFileName = "<parser.grammarFileName>"

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

    sharedContextCache = PredictionContextCache()

    literalNames = [ <parser.literalNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="\"\<INVALID>\"", separator=", ", wrap, anchor> ]

    <parser.rules:{r | RULE_<r.name> = <r.index>}; separator="\n", wrap, anchor>

    ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    EOF = <TokenLabelType()>.EOF
    <if(parser.tokens)>
    <parser.tokens:{k | <k>=<parser.tokens.(k)>}; separator="\n", wrap, anchor>
    <endif>
```

```
  <parser:(ctor)()>

  <namedActions.members>

  <funcs; separator="\n">



<if(sempredFuncs)>
  def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
    if self._predicates == None:
      self._predicates = dict()
<parser.sempredFuncs.values:{f |
    self._predicates[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n        ">
    pred = self._predicates.get(ruleIndex, None)
    if pred is None:
      raise Exception("No predicate with index:" + str(ruleIndex))
    else:
      return pred(localctx, predIndex)

  <sempredFuncs.values; separator="\n">
<endif>



>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
def action(self, localctx:RuleContext, ruleIndex:int, actionIndex:int):
  if self._actions is None:
    actions = dict()
<recog.actionFuncs.values:{f|
    actions[<f.ruleIndex>] = self.<f.name>_action }; separator="\n">
    self._actions = actions
  action = self._actions.get(ruleIndex, None)
  if action is not None:
    action(localctx, actionIndex)
  else:
    raise Exception("No registered action for:" + str(ruleIndex))

<actionFuncs.values; separator="\n">

<endif>
<if(sempredFuncs)>
def sempred(self, localctx:RuleContext, ruleIndex:int, predIndex:int):
  if self._predicates is None:
    preds = dict()
```

```
<recog.sempredFuncs.values:{f|
    preds[<f.ruleIndex>] = self.<f.name>_sempred}; separator="\n">
    self._predicates = preds
  pred = self._predicates.get(ruleIndex, None)
  if pred is not None:
    return pred(localctx, predIndex)
  else:
    raise Exception("No registered predicate for:" + str(ruleIndex))

<sempredFuncs.values; separator="\n">
<endif>
>>


parser_ctor(p) ::= <<
def __init__(self, input:TokenStream, output:TextIO = sys.stdout):
  super().__init__(input, output)
  self.checkVersion("<file.ANTLRVersion>")
  self._interp = ParserATNSimulator(self, self.atn, self.decisionsToDFA, self.sharedContextCache)
  self._predicates = None


>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

def <r.name>_action(self, localctx:<r.ctxType> , actionIndex:int):
<actions:{index|
<if(first(actions))>
  if actionIndex == <index>:
    <actions.(index)>
<elseif(rest(actions))>
  elif actionIndex == <index>:
    <actions.(index)>
<endif> }; separator="\n">
>>


/* This generates a private method since the predIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleSempredFunction(r, actions) ::= <<
def <r.name>_sempred(self, localctx:<r.ctxType>, predIndex:int):
  <actions:{index|
<if(first(actions))>
  if predIndex == <index>:
    return <actions.(index)>
<elseif(rest(actions))>
```

```
     elif predIndex == <index>:
          return <actions.(index)>
<endif> }; separator="\n">

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self<currentRule.args:{a | , <a.name><if(a.type)>:<a.type><endif>}>):

  localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, self.state<currentRule.args:{a | , <a.name>}>)
  self.enterRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>)
  <namedActions.init>
  <locals; separator="\n">
  try:
      <code>
      <postamble; separator="\n">
      <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  except RecognitionException as re:
      localctx.exception = re
      self._errHandler.reportError(self, re)
      self._errHandler.recover(self, re)
  <endif>
  finally:
      <finallyAction>
      self.exitRule()
  return localctx

>>

LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

def <currentRule.name>(self, _p:int=0<if(currentRule.args)>, <args:{a | <a>}><endif>):
  _parentctx = self._ctx
  _parentState = self.state
```

```
localctx = <parser.name>.<currentRule.ctxType>(self, self._ctx, _parentState<args:{a | , <a.name>}>)
_prevctx = localctx
_startState = <currentRule.startState>
self.enterRecursionRule(localctx, <currentRule.startState>, self.RULE_<currentRule.name>, _p)
<namedActions.init>
<locals; separator="\n">
try:
    <code>
    <postamble; separator="\n">
    <namedActions.after>
except RecognitionException as re:
    localctx.exception = re
    self._errHandler.reportError(self, re)
    self._errHandler.recover(self, re)
finally:
    <finallyAction>
    self.unrollRecursionContexts(_parentctx)
return localctx

>>


CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = <parser.name>.<currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(self, localctx)<endif>
self.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>)
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  <error>

>>
```

```
LL1OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
token = self._input.LA(1)
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  pass}; separator="\nel">
else:
  pass
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
if <expr>:
  <alts; separator="\n">

<!else if ( !(<followExpr>) ) <error>!>
>>



LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<preamble; separator="\n">
while <loopExpr>:
  <alts; separator="\n">
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  <iteration>

>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
<preamble; separator="\n">
while True:
  <alts; separator="\n">
  self.state = <choice.stateNumber> <! loopback/exit decision !>
  self._errHandler.sync(self)
  <iteration>
  if not (<loopExpr>):
    break

>>
```

```
// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i>:
  <alt>
  pass
}; separator="\nel">

>>

OptionalBlock(choice, alts, error) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
la_ = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
<alts:{alt |
if la_ == <i><if(!choice.ast.greedy)>+1<endif>:
  <alt>
}; separator="\nel">

>>

StarBlock(choice, alts, sync, iteration) ::= <<
self.state = <choice.stateNumber>
self._errHandler.sync(self)
_alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  if _alt==1<if(!choice.ast.greedy)>+1<endif>:
     <iteration>
     <alts> <! should only be one !>
  self.state = <choice.loopBackStateNumber>
  self._errHandler.sync(self)
  _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)

>>

PlusBlock(choice, alts, error) ::= <<
self.state = <choice.blockStartStateNumber> <! alt block decision !>
self._errHandler.sync(self)
_alt = 1<if(!choice.ast.greedy)>+1<endif>
while _alt!=<choice.exitAlt> and _alt!=ATN.INVALID_ALT_NUMBER:
  <alts:{alt|
if _alt == <i><if(!choice.ast.greedy)>+1<endif>:
```

```
   <alt>
}; separator="\nel">
   else:
      <error>
   self.state = <choice.loopBackStateNumber> <! loopback/exit decision !>
   self._errHandler.sync(self)
   _alt = self._interp.adaptivePredict(self._input,<choice.decision>,self._ctx)


>>


Sync(s) ::= "sync(<s.expecting.name>)"


ThrowNoViableAlt(t) ::= "raise NoViableAltException(self)"


TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" or ">
>>


// Java language spec 15.19 - shift operators mask operands rather than overflow to 0... need range test
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x3f) == 0
>>


// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})>) and ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) != 0)
%>


isZero ::= [
"0":true,
default:false
]


offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>


offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>


// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>==<parser.name>.<ttype>}; separator=" or ">
%>
```

```
cases(ttypes) ::= <<
if token in [<ttypes:{t | <parser.name>.<t>}; separator=", ">]:
>>


InvokeRule(r, argExprsChunks) ::= <<
self.state = <r.stateNumber>
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>self.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>)
>>


MatchToken(m) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>self.match(<parser.name>.<m.name>)
>>


MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"


MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"


CommonSetStuff(m, expr, capture, invert) ::= <<
self.state = <m.stateNumber>
<if(m.labels)><m.labels:{l | <labelref(l)> = }>self._input.LT(1)<endif>
<capture>
<if(invert)>if <m.varName> \<= 0 or <expr><else>if not(<expr>)<endif>:
<if(m.labels)><m.labels:{l |    <labelref(l)> = }><else>    <endif>self._errHandler.recoverInline(self)
else:
    self._errHandler.reportMatch(self)
    self.consume()
>>


Wildcard(w) ::= <<
self.state = <w.stateNumber>
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>self.matchWildcard()
>>


// ACTION STUFF


Action(a, foo, chunks) ::= "<chunks>"


ArgAction(a, chunks) ::= "<chunks>"


SemPred(p, chunks, failChunks) ::= <<
self.state = <p.stateNumber>
if not <chunks>:
    from antlr4.error.Errors import FailedPredicateException
    raise FailedPredicateException(self, <p.predicate><if(failChunks)>, <failChunks><elseif(p.msg)>,
<p.msg><endif>)
```

```
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
    <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand()     ::= "skip()"
LexerMoreCommand()     ::= "more()"
LexerPopModeCommand() ::= "popMode()"

LexerTypeCommand(arg, grammar)      ::= "_type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "_channel = <arg>"
LexerModeCommand(arg, grammar)      ::= "_mode = <arg>"
LexerPushModeCommand(arg, grammar)  ::= "pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(None if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.type())"
TokenPropertyRef_line(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(0 if (<ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(0 if <ctx(t)>.<t.label> is None else <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(0 if <ctx(t)>.<t.label> is None else int(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r)  ::= "(None if <ctx(r)>.<r.label> is None else <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r)  ::= "(None if <ctx(r)>.<r.label> is None else
self._input.getText(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop))"
RulePropertyRef_ctx(r)   ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r)  ::= "self"
```

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "self._input.getText(localctx.start, self._input.LT(-1))"
ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "self"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.append(<labelref(a.label)>)"

TokenDecl(t) ::= "self.<t.name> = None # <TokenLabelType()>"
TokenTypeDecl(t) ::= "self.<t.name> = 0 # <TokenLabelType()> type"
TokenListDecl(t) ::= "self.<t.name> = list() # of <TokenLabelType()>s"
RuleContextDecl(r) ::= "self.<r.name> = None # <r.ctxName>"
RuleContextListDecl(rdecl) ::= "self.<rdecl.name> = list() # of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)   ::= <<
def <t.name>(self):
  return self.getToken(<parser.name>.<t.name>, 0)
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<
def <t.name>(self, i:int=None):
  if i is None:
    return self.getTokens(<parser.name>.<t.name>)
  else:
    return self.getToken(<parser.name>.<t.name>, i)
>>

ContextRuleGetterDecl(r)   ::= <<
def <r.name>(self):
  return self.getTypedRuleContext(<parser.name>.<r.ctxName>,0)

>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

```
>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
def <r.name>(self, i:int=None):
  if i is None:
      return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)
  else:
      return self.getTypedRuleContext(<parser.name>.<r.ctxName>,i)

>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
*  r becomes rContext.
*/
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"

CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = self._input.LA(1)"

StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
class <struct.name>(<if(contextSuperClass)><contextSuperClass><else>ParserRuleContext<endif>):

  def __init__(self, parser, parent:ParserRuleContext=None, invokingState:int=-1<struct.ctorAttrs:{a | ,
<a.name><if(a.type)>:<a.type><endif>=None}>):
      super().__init__(parent, invokingState)
      self.parser = parser
      <attrs:{a | <a>}; separator="\n">
      <struct.ctorAttrs:{a | self.<a.name> = <a.name>}; separator="\n">

  <getters:{g | <g>}; separator="\n\n">

  def getRuleIndex(self):
      return <parser.name>.RULE_<struct.derivedFromName>

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
  def copyFrom(self, ctx:ParserRuleContext):
      super().copyFrom(ctx)
      <struct.attrs:{a | self.<a.name> = ctx.<a.name>}; separator="\n">

<endif>
  <dispatchMethods; separator="\n">
```

```
    <extensionMembers; separator="\n">

>>

AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
class <struct.name>(<currentRule.name; format="cap">Context):

    def __init__(self, parser, ctx:ParserRuleContext): # actually a <parser.name>.<currentRule.name;
format="cap">Context
        super().__init__(parser)
        <attrs:{a | <a>}; separator="\n">
        self.copyFrom(ctx)

  <getters:{g | <g>}; separator="\n">

  <dispatchMethods; separator="\n">

>>

ListenerDispatchMethod(method) ::= <<
def <if(method.isEnter)>enter<else>exit<endif>Rule(self, listener:ParseTreeListener):
  if hasattr( listener, "<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">" ):
    listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(self)

>>

VisitorDispatchMethod(method) ::= <<
def accept(self, visitor:ParseTreeVisitor):
  if hasattr( visitor, "visit<struct.derivedFromName; format="cap">" ):
    return visitor.visit<struct.derivedFromName; format="cap">(self)
  else:
    return visitor.visitChildren(self)

>>

AttributeDecl(d) ::= "self.<d.name> = <if(d.initValue)><d.initValue><else>None<endif>"

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec)  ::= "self.precpred(self._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()            ::= "self._ctx.stop = self._input.LT(-1)"
```

```
recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = <parser.name>.<ctxName>Context(self, _parentctx, _parentState)
<if(label)>localctx.<label> = _prevctx<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = <parser.name>.<currentAltLabel; format="cap">Context(self, <parser.name>.<ruleName;
format="cap">Context(self, _parentctx, _parentState))
<if(label)>
<if(isListLabel)>
localctx.<label>.append(_prevctx)
<else>
localctx.<label> = _prevctx
<endif>
<endif>
self.pushNewRecursionContext(localctx, _startState, self.RULE_<ruleName>)
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = <parser.name>.<ctxName>Context(self, localctx)
self._ctx = localctx
_prevctx = localctx
>>

recRuleSetPrevCtx() ::= <<
if self._parseListeners is not None:
    self.triggerExitRuleEvent()
_prevctx = localctx
>>

LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
from antlr4 import *
from io import StringIO
from typing.io import TextIO
import sys

<namedActions.header>

<lexer>
>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
if __name__ is not None and "." in __name__:
    from .<superClass> import <superClass>
```

```
else:
    from <superClass> import <superClass>

<endif>
<atn>

class <lexer.name>(<if(superClass)><superClass><else>Lexer<endif>):

    atn = ATNDeserializer().deserialize(serializedATN())

    decisionsToDFA = [ DFA(ds, i) for i, ds in enumerate(atn.decisionToState) ]

<if(lexer.channels)>
    <lexer.channels:{c| <c> = <lexer.channels.(c)>}; separator="\n">

<endif>
<if(rest(lexer.modes))>
    <rest(lexer.modes):{m| <m> = <i>}; separator="\n">

<endif>
    <lexer.tokens:{k | <k> = <lexer.tokens.(k)>}; separator="\n", wrap, anchor>

    channelNames = [ u"DEFAULT_TOKEN_CHANNEL", u"HIDDEN"<if (lexer.channels)>, <lexer.channels:{c|
u"<c>"}; separator=", ", wrap, anchor><endif> ]

    modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ]

    literalNames = [ "\<INVALID>",
            <lexer.literalNames:{t | <t>}; separator=", ", wrap, anchor> ]

    symbolicNames = [ "\<INVALID>",
            <lexer.symbolicNames:{t | <t>}; separator=", ", wrap, anchor> ]

    ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ]

    grammarFileName = "<lexer.grammarFileName>"

    def __init__(self, input=None, output:TextIO = sys.stdout):
        super().__init__(input, output)
        self.checkVersion("<lexerFile.ANTLRVersion>")
        self._interp = LexerATNSimulator(self, self.atn, self.decisionsToDFA, PredictionContextCache())
        self._actions = None
        self._predicates = None

    <namedActions.members>

    <dumpActions(lexer, "", actionFuncs, sempredFuncs)>
```

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

def serializedATN():
  with StringIO() as buf:
    buf.write("<model.serialized; wrap={")<\n>   buf.write("}>")
    return buf.getvalue()

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<pythonTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".py"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/Python3/Python3.stg
No license file was found, but licenses were detected in source scan.

3. The name of the author may not be used to endorse or promote products
derived from this software without specific prior written permission.

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/parse/ANTLRParser.g
No license file was found, but licenses were detected in source scan.

```
/*
 * [The "BSD license"]
 *  Copyright (c) 2012-2016 Terence Parr
 *  Copyright (c) 2012-2016 Sam Harwell
 *  Copyright (c) 2014 Eric Vergnaud
 *  All rights reserved.
 *
 *  Redistribution and use in source and binary forms, with or without
 *  modification, are permitted provided that the following conditions
 *  are met:
 *
 *  1. Redistributions of source code must retain the above copyright
 *     notice, this list of conditions and the following disclaimer.
 *  2. Redistributions in binary form must reproduce the above copyright
 *     notice, this list of conditions and the following disclaimer in the
 *     documentation and/or other materials provided with the distribution.
 *  3. The name of the author may not be used to endorse or promote products
 *     derived from this software without specific prior written permission.
 *
 *  THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR
 *  IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES
 *  OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED.
 *  IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT,
 *  INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT
 *  NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE,
 *  DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY
 *  THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT
 *  (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF
 *  THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.
 */

/** ANTLR tool checks output templates are compatible with tool code generation.
 *  For now, a simple string match used on x.y of x.y.z scheme.
 *  Must match Tool.VERSION during load to templates.
 *
 *  REQUIRED.
 */

javascriptTypeInitMap ::= [
 "bool":"false",
 "int":"0",
```

```
 "float":"0.0",
 "str":"",
 default:"{}" // anything other than a primitive type is an object
]

// args must be <object-model-object>, <fields-resulting-in-STs>

ParserFile(file, parser, namedActions, contextSuperClass) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');
<if(file.genListener)>
var <file.grammarName>Listener = require('./<file.grammarName>Listener').<file.grammarName>Listener;
<endif>
<if(file.genVisitor)>
var <file.grammarName>Visitor = require('./<file.grammarName>Visitor').<file.grammarName>Visitor;
<endif>

<namedActions.header>
<parser>
>>

ListenerFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete listener for a parse tree produced by <file.parserName>.
function <file.grammarName>Listener() {
 antlr4.tree.ParseTreeListener.call(this);
 return this;
}

<file.grammarName>Listener.prototype = Object.create(antlr4.tree.ParseTreeListener.prototype);
<file.grammarName>Listener.prototype.constructor = <file.grammarName>Listener;

<file.listenerNames:{lname |
// Enter a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.enter<lname; format="cap"> = function(ctx) {
\};

// Exit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Listener.prototype.exit<lname; format="cap"> = function(ctx) {
\};

}; separator="\n">

exports.<file.grammarName>Listener = <file.grammarName>Listener;
>>
```

```
VisitorFile(file, header, namedActions) ::= <<
<fileHeader(file.grammarFileName, file.ANTLRVersion)>
var antlr4 = require('antlr4/index');

// This class defines a complete generic visitor for a parse tree produced by <file.parserName>.

function <file.grammarName>Visitor() {
 antlr4.tree.ParseTreeVisitor.call(this);
 return this;
}

<file.grammarName>Visitor.prototype = Object.create(antlr4.tree.ParseTreeVisitor.prototype);
<file.grammarName>Visitor.prototype.constructor = <file.grammarName>Visitor;

<file.visitorNames:{lname |
// Visit a parse tree produced by <file.parserName>#<lname>.
<file.grammarName>Visitor.prototype.visit<lname; format="cap"> = function(ctx) {
 return this.visitChildren(ctx);
\};

}; separator="\n">

exports.<file.grammarName>Visitor = <file.grammarName>Visitor;
>>


fileHeader(grammarFileName, ANTLRVersion) ::= <<
// Generated from <grammarFileName; format="java-escape"> by ANTLR <ANTLRVersion>
// jshint ignore: start
>>

Parser(parser, funcs, atn, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

var grammarFileName = "<parser.grammarFileName; format="java-escape">";

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

var sharedContextCache = new antlr4.PredictionContextCache();

var literalNames = [ <parser.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];
```

```
var symbolicNames = [ <parser.symbolicNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

var ruleNames =  [ <parser.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

function <parser.name> (input) {
 <superClass; null="antlr4.Parser">.call(this, input);
   this._interp = new antlr4.atn.ParserATNSimulator(this, atn, decisionsToDFA, sharedContextCache);
   this.ruleNames = ruleNames;
   this.literalNames = literalNames;
   this.symbolicNames = symbolicNames;
 <namedActions.members>
   return this;
}

<parser.name>.prototype = Object.create(<superClass; null="antlr4.Parser">.prototype);
<parser.name>.prototype.constructor = <parser.name>;

Object.defineProperty(<parser.name>.prototype, "atn", {
 get : function() {
  return atn;
 }
});

<parser.name>.EOF = antlr4.Token.EOF;
<if(parser.tokens)>
<parser.tokens:{k | <parser.name>.<k> = <parser.tokens.(k)>;}; separator="\n", wrap, anchor>
<endif>

<parser.rules:{r | <parser.name>.RULE_<r.name> = <r.index>;}; separator="\n", wrap, anchor>

<funcs; separator="\n">

<if(sempredFuncs)>
<parser.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch(ruleIndex) {
 <parser.sempredFuncs.values:{f | case <f.ruleIndex>:
  return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
  default:
     throw "No predicate with index:" + ruleIndex;
 }
};

<sempredFuncs.values; separator="\n">
<endif>

exports.<parser.name> = <parser.name>;
```

```
>>

dumpActions(recog, argFuncs, actionFuncs, sempredFuncs) ::= <<
<if(actionFuncs)>
<lexer.name>.prototype.action = function(localctx, ruleIndex, actionIndex) {
 switch (ruleIndex) {
 <recog.actionFuncs.values:{f|
case <f.ruleIndex>:
 this.<f.name>_action(localctx, actionIndex);
 break;}; separator="\n">
 default:
  throw "No registered action for:" + ruleIndex;
 }
};

<actionFuncs.values; separator="\n">
<endif>
<if(sempredFuncs)>
<lexer.name>.prototype.sempred = function(localctx, ruleIndex, predIndex) {
 switch (ruleIndex) {
  <recog.sempredFuncs.values:{f| case <f.ruleIndex>:
 return this.<f.name>_sempred(localctx, predIndex);}; separator="\n">
   default:
    throw "No registered predicate for:" + ruleIndex;
  }
};

<sempredFuncs.values; separator="\n">
<endif>
>>


/* This generates a private method since the actionIndex is generated, making an
 * overriding implementation impossible to maintain.
 */
RuleActionFunction(r, actions) ::= <<

<lexer.name>.prototype.<r.name>_action = function(localctx , actionIndex) {
 switch (actionIndex) {
 <actions:{index|
case <index>:
 <actions.(index)>
 break;}; separator="\n">
 default:
  throw "No registered action for:" + actionIndex;
 }
};
>>
```

```
/* This generates a private method since the predIndex is generated, making an
* overriding implementation impossible to maintain.
*/
RuleSempredFunction(r, actions) ::= <<
<if (r.factory.g.lexer)><lexer.name><else><parser.name><endif>.prototype.<r.name>_sempred = function(localctx,
predIndex) {
 switch(predIndex) {
  <actions:{index| case <index>:
 return <actions.(index)>;}; separator="\n">
  default:
   throw "No predicate with index:" + predIndex;
 }
};

>>

RuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,namedActions,finallyAction,postamble,exceptions)
::= <<

<ruleCtx>

<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<! Define fields of this parser to export the context classes !>
<parser.name>.<currentRule.ctxType> = <currentRule.ctxType>;

<parser.name>.prototype.<currentRule.name> = function(<currentRule.args:{a | <a.name>}; separator=", ">) {

  var localctx = new <currentRule.ctxType>(this, this._ctx, this.state<currentRule.args:{a | , <a.name>}>);
  this.enterRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>);
  <namedActions.init>
  <locals; separator="\n">
  try {
     <code>
     <postamble; separator="\n">
     <namedActions.after>
  <if(exceptions)>
  <exceptions; separator="\n">
  <else>
  } catch (re) {
   if(re instanceof antlr4.error.RecognitionException) {
      localctx.exception = re;
      this._errHandler.reportError(this, re);
      this._errHandler.recover(this, re);
    } else {
     throw re;
    }
```

```
  }<endif> finally {
    <finallyAction>
    this.exitRule();
  }
  return localctx;
};

>>


LeftRecursiveRuleFunction(currentRule,args,code,locals,ruleCtx,altLabelCtxs,
 namedActions,finallyAction,postamble) ::=
<<

<ruleCtx>
<altLabelCtxs:{l | <altLabelCtxs.(l)>}; separator="\n">

<parser.name>.prototype.<currentRule.name> = function(_p<if(currentRule.args)>, <args:{a | , <a>}><endif>) {
 if(_p===undefined) {
    _p = 0;
 }
  var _parentctx = this._ctx;
  var _parentState = this.state;
  var localctx = new <currentRule.ctxType>(this, this._ctx, _parentState<args:{a | , <a.name>}>);
  var _prevctx = localctx;
  var _startState = <currentRule.startState>;
  this.enterRecursionRule(localctx, <currentRule.startState>, <parser.name>.RULE_<currentRule.name>, _p);
  <namedActions.init>
  <locals; separator="\n">
  try {
    <code>
    <postamble; separator="\n">
    <namedActions.after>
  } catch( error) {
    if(error instanceof antlr4.error.RecognitionException) {
     localctx.exception = error;
     this._errHandler.reportError(this, error);
     this._errHandler.recover(this, error);
    } else {
     throw error;
    }
  } finally {
    <finallyAction>
    this.unrollRecursionContexts(_parentctx)
  }
  return localctx;
};

>>
```

```
CodeBlockForOuterMostAlt(currentOuterMostAltCodeBlock, locals, preamble, ops) ::= <<
<if(currentOuterMostAltCodeBlock.altLabel)>localctx = new <currentOuterMostAltCodeBlock.altLabel;
format="cap">Context(this, localctx);<endif>
this.enterOuterAlt(localctx, <currentOuterMostAltCodeBlock.alt.altNum>);
<CodeBlockForAlt(currentAltCodeBlock=currentOuterMostAltCodeBlock, ...)>
>>


CodeBlockForAlt(currentAltCodeBlock, locals, preamble, ops) ::= <<
<locals; separator="\n">
<preamble; separator="\n">
<ops; separator="\n">
>>


LL1AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = this._input.LT(1);<endif>
<preamble; separator="\n">
switch(this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
  <alt>
  break;}; separator="\n">
default:
  <error>
}
>>


LL1OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
switch (this._input.LA(1)) {
<choice.altLook,alts:{look,alt| <cases(ttypes=look)>
 <alt>
 break;}; separator="\n">
default:
 break;
}
>>


LL1OptionalBlockSingleAlt(choice, expr, alts, preamble, error, followExpr) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
if(<expr>) {
  <alts; separator="\n">
}
<!else if ( !(<followExpr>) ) <error>!>
```

```
>>

LL1StarBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<preamble; separator="\n">
while(<loopExpr>) {
  <alts; separator="\n">
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  <iteration>
}
>>

LL1PlusBlockSingleAlt(choice, loopExpr, alts, preamble, iteration) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
<preamble; separator="\n">
do {
  <alts; separator="\n">
  this.state = <choice.stateNumber>; <! loopback/exit decision !>
  this._errHandler.sync(this);
  <iteration>
} while(<loopExpr>);
>>

// LL(*) stuff

AltBlock(choice, preamble, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
<if(choice.label)><labelref(choice.label)> = _input.LT(1)<endif>
<preamble; separator="\n">
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
switch(la_) {
<alts:{alt |
case <i>:
  <alt>
  break;
}; separator="\n">
}
>>

OptionalBlock(choice, alts, error) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var la_ = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
<alts:{alt |
```

```
if(la_===<i><if(!choice.ast.greedy)>+1<endif>) {
  <alt>
}; separator="\n} else ">
}
>>


StarBlock(choice, alts, sync, iteration) ::= <<
this.state = <choice.stateNumber>;
this._errHandler.sync(this);
var _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx)
while(_alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER) {
  if(_alt===1<if(!choice.ast.greedy)>+1<endif>) {
    <iteration>
    <alts> <! should only be one !>
  }
  this.state = <choice.loopBackStateNumber>;
  this._errHandler.sync(this);
  _alt = this._interp.adaptivePredict(this._input,<choice.decision>,this._ctx);
}

>>


PlusBlock(choice, alts, error) ::= <<
this.state = <choice.blockStartStateNumber>; <! alt block decision !>
this._errHandler.sync(this);
var _alt = 1<if(!choice.ast.greedy)>+1<endif>;
do {
 switch (_alt) {
 <alts:{alt|
case <i><if(!choice.ast.greedy)>+1<endif>:
 <alt>
 break;}; separator="\n">
 default:
  <error>
 }
 this.state = <choice.loopBackStateNumber>; <! loopback/exit decision !>
 this._errHandler.sync(this);
 _alt = this._interp.adaptivePredict(this._input,<choice.decision>, this._ctx);
} while ( _alt!=<choice.exitAlt> && _alt!=antlr4.atn.ATN.INVALID_ALT_NUMBER );
>>

Sync(s) ::= "sync(<s.expecting.name>)"

ThrowNoViableAlt(t) ::= "throw new antlr4.error.NoViableAltException(this);"

TestSetInline(s) ::= <<
<s.bitsets:{bits | <if(rest(rest(bits.ttypes)))><bitsetBitfieldComparison(s, bits)><else><bitsetInlineComparison(s,
bits)><endif>}; separator=" || ">
```

```
>>

// Javascript language spec - shift operators are 32 bits long max
testShiftInRange(shiftAmount) ::= <<
((<shiftAmount>) & ~0x1f) == 0
>>

// produces smaller bytecode only when bits.ttypes contains more than two items
bitsetBitfieldComparison(s, bits) ::= <%
(<testShiftInRange({<offsetShiftVar(s.varName, bits.shift)>})> && ((1 \<\< <offsetShiftVar(s.varName,
bits.shift)>) & (<bits.ttypes:{ttype | (1 \<\< <offsetShiftType(ttype, bits.shift)>)}; separator=" | ">)) !== 0)
%>

isZero ::= [
"0":true,
default:false
]

offsetShiftVar(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<shiftAmount> - <offset>)<else><shiftAmount><endif>
%>

offsetShiftType(shiftAmount, offset) ::= <%
<if(!isZero.(offset))>(<parser.name>.<shiftAmount> - <offset>)<else><parser.name>.<shiftAmount><endif>
%>

// produces more efficient bytecode when bits.ttypes contains at most two items
bitsetInlineComparison(s, bits) ::= <%
<bits.ttypes:{ttype | <s.varName>===<parser.name>.<ttype>}; separator=" || ">
%>

cases(ttypes) ::= <<
<ttypes:{t | case <parser.name>.<t>:}; separator="\n">
>>

InvokeRule(r, argExprsChunks) ::= <<
this.state = <r.stateNumber>;
<if(r.labels)><r.labels:{l | <labelref(l)> =
}><endif>this.<r.name>(<if(r.ast.options.p)><r.ast.options.p><if(argExprsChunks)>,<endif><endif><argExprsChu
nks>);
>>

MatchToken(m) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this.match(<parser.name>.<m.name>);
>>

MatchSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, false)>"
```

MatchNotSet(m, expr, capture) ::= "<CommonSetStuff(m, expr, capture, true)>"

CommonSetStuff(m, expr, capture, invert) ::= <<
this.state = <m.stateNumber>;
<if(m.labels)><m.labels:{l | <labelref(l)> = }>this._input.LT(1);<endif>
<capture>
<if(invert)>if(<m.varName>\<=0 || <expr>)<else>if(!(<expr>))<endif> {
   <if(m.labels)><m.labels:{l | <labelref(l)> = }><endif>this._errHandler.recoverInline(this);
}
else {
 this._errHandler.reportMatch(this);
   this.consume();
}
>>

Wildcard(w) ::= <<
this.state = <w.stateNumber>;
<if(w.labels)><w.labels:{l | <labelref(l)> = }><endif>this.matchWildcard();
>>

// ACTION STUFF

Action(a, foo, chunks) ::= "<chunks>"

ArgAction(a, chunks) ::= "<chunks>"

SemPred(p, chunks, failChunks) ::= <<
this.state = <p.stateNumber>;
if (!(<chunks>)) {
   throw new antlr4.error.FailedPredicateException(this, <p.predicate><if(failChunks)>,
<failChunks><elseif(p.msg)>, <p.msg><endif>);
}
>>

ExceptionClause(e, catchArg, catchAction) ::= <<
catch (<catchArg>) {
 <catchAction>
}
>>

// lexer actions are not associated with model objects

LexerSkipCommand() ::= "this.skip()"
LexerMoreCommand() ::= "this.more()"
LexerPopModeCommand() ::= "this.popMode()"
LexerTypeCommand(arg, grammar)   ::= "this._type = <arg>"
LexerChannelCommand(arg, grammar)   ::= "this._channel = <arg>"

LexerModeCommand(arg, grammar)   ::= "this._mode = <arg>"
LexerPushModeCommand(arg, grammar) ::= "this.pushMode(<arg>)"

ActionText(t) ::= "<t.text>"
ActionTemplate(t) ::= "<t.st>"
ArgRef(a) ::= "localctx.<a.name>"
LocalRef(a) ::= "localctx.<a.name>"
RetValueRef(a) ::= "localctx.<a.name>"
QRetValueRef(a) ::= "<ctx(a)>.<a.dict>.<a.name>"
/** How to translate $tokenLabel */
TokenRef(t) ::= "<ctx(t)>.<t.name>"
LabelRef(t) ::= "<ctx(t)>.<t.name>"
ListLabelRef(t) ::= "<ctx(t)>.<ListLabelName(t.name)>"
SetAttr(s,rhsChunks) ::= "<ctx(s)>.<s.name> = <rhsChunks>"

TokenLabelType() ::= "<file.TokenLabelType; null={Token}>"
InputSymbolType() ::= "<file.InputSymbolType; null={Token}>"

TokenPropertyRef_text(t) ::= "(<ctx(t)>.<t.label>===null ? null : <ctx(t)>.<t.label>.text)"
TokenPropertyRef_type(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.type)"
TokenPropertyRef_line(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.line)"
TokenPropertyRef_pos(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.column)"
TokenPropertyRef_channel(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.channel)"
TokenPropertyRef_index(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : <ctx(t)>.<t.label>.tokenIndex)"
TokenPropertyRef_int(t) ::= "(<ctx(t)>.<t.label> === null ? 0 : parseInt(<ctx(t)>.<t.label>.text))"

RulePropertyRef_start(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.start)"
RulePropertyRef_stop(r) ::= "(<ctx(r)>.<r.label>===null ? null : <ctx(r)>.<r.label>.stop)"
RulePropertyRef_text(r) ::= "(<ctx(r)>.<r.label>===null ? null : this._input.getText(new
antlr4.Interval(<ctx(r)>.<r.label>.start,<ctx(r)>.<r.label>.stop)))"
RulePropertyRef_ctx(r) ::= "<ctx(r)>.<r.label>"
RulePropertyRef_parser(r) ::= "this"

ThisRulePropertyRef_start(r) ::= "localctx.start"
ThisRulePropertyRef_stop(r) ::= "localctx.stop"
ThisRulePropertyRef_text(r) ::= "this._input.getText(new antlr4.Interval(localctx.start, this._input.LT(-1)))"
ThisRulePropertyRef_ctx(r) ::= "localctx"
ThisRulePropertyRef_parser(r) ::= "this"

NonLocalAttrRef(s)   ::= "getInvokingContext(<s.ruleIndex>).<s.name>"
SetNonLocalAttr(s, rhsChunks) ::= "getInvokingContext(<s.ruleIndex>).<s.name> = <rhsChunks>"

AddToLabelList(a) ::= "<ctx(a.label)>.<a.listName>.push(<labelref(a.label)>);"

TokenDecl(t) ::= "this.<t.name> = null; // <TokenLabelType()>"
TokenTypeDecl(t) ::= "var <t.name> = 0; // <TokenLabelType()> type"
TokenListDecl(t) ::= "this.<t.name> = []; // of <TokenLabelType()>s"
RuleContextDecl(r) ::= "this.<r.name> = null; // <r.ctxName>"

```
RuleContextListDecl(rdecl) ::= "this.<rdecl.name> = []; // of <rdecl.ctxName>s"

ContextTokenGetterDecl(t)     ::= <<
<t.name> = function() {
  return this.getToken(<parser.name>.<t.name>, 0);
};
>>

// should never be called
ContextTokenListGetterDecl(t) ::= <<
def <t.name>_list(self):
  return self.getTokens(<parser.name>.<t.name>)
>>

ContextTokenListIndexedGetterDecl(t) ::= <<
<t.name> = function(i) {
 if(i===undefined) {
  i = null;
 }
  if(i===null) {
    return this.getTokens(<parser.name>.<t.name>);
  } else {
    return this.getToken(<parser.name>.<t.name>, i);
  }
};

>>

ContextRuleGetterDecl(r)     ::= <<
<r.name> = function() {
  return this.getTypedRuleContext(<r.ctxName>,0);
};
>>

// should never be called
ContextRuleListGetterDecl(r)   ::= <<
def <r.name>_list(self):
  return self.getTypedRuleContexts(<parser.name>.<r.ctxName>)

>>

ContextRuleListIndexedGetterDecl(r)   ::= <<
<r.name> = function(i) {
  if(i===undefined) {
     i = null;
  }
  if(i===null) {
     return this.getTypedRuleContexts(<r.ctxName>);
```

```
    } else {
        return this.getTypedRuleContext(<r.ctxName>,i);
    }
};
>>

LexerRuleContext() ::= "RuleContext"

/** The rule context name is the rule followed by a suffix; e.g.,
 * r becomes rContext.
 */
RuleContextNameSuffix() ::= "Context"

ImplicitTokenLabel(tokenName) ::= "_<tokenName>"
ImplicitRuleLabel(ruleName)   ::= "_<ruleName>"
ImplicitSetLabel(id)    ::= "_tset<id>"
ListLabelName(label)    ::= "<label>"


CaptureNextToken(d) ::= "<d.varName> = self._input.LT(1)"
CaptureNextTokenType(d) ::= "<d.varName> = this._input.LA(1);"


StructDecl(struct,ctorAttrs,attrs,getters,dispatchMethods,interfaces,extensionMembers) ::= <<
function <struct.name>(parser, parent, invokingState<struct.ctorAttrs:{a | , <a.name>}>) {
 if(parent===undefined) {
     parent = null;
 }
 if(invokingState===undefined || invokingState===null) {
 invokingState = -1;
 }
 <if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.call(this, parent,
invokingState);
   this.parser = parser;
   this.ruleIndex = <parser.name>.RULE_<struct.derivedFromName>;
   <attrs:{a | <a>}; separator="\n">
   <struct.ctorAttrs:{a | this.<a.name> = <a.name> || null;}; separator="\n">
   return this;
}

<struct.name>.prototype =
Object.create(<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">

<if(struct.provideCopyFrom)> <! don't need copy unless we have subclasses !>
<struct.name>.prototype.copyFrom = function(ctx) {
<if(contextSuperClass)><contextSuperClass><else>antlr4.ParserRuleContext<endif>.prototype.copyFrom.call(this,
ctx);
```

```
    <struct.attrs:{a | this.<a.name> = ctx.<a.name>;}; separator="\n">
};
<endif>
<dispatchMethods; separator="\n">
<extensionMembers; separator="\n">


>>


AltLabelStructDecl(struct,attrs,getters,dispatchMethods) ::= <<
function <struct.name>(parser, ctx) {
 <currentRule.name; format="cap">Context.call(this, parser);
   <attrs:{a | <a>;}; separator="\n">
   <currentRule.name; format="cap">Context.prototype.copyFrom.call(this, ctx);
   return this;
}

<struct.name>.prototype = Object.create(<currentRule.name; format="cap">Context.prototype);
<struct.name>.prototype.constructor = <struct.name>;

<! Define fields of this parser to export this struct/context class !>
<parser.name>.<struct.name> = <struct.name>;

<getters:{g | <struct.name>.prototype.<g>}; separator="\n\n">
<dispatchMethods; separator="\n">


>>


ListenerDispatchMethod(method) ::= <<
<struct.name>.prototype.<if(method.isEnter)>enter<else>exit<endif>Rule = function(listener) {
   if(listener instanceof <parser.grammarName>Listener ) {
       listener.<if(method.isEnter)>enter<else>exit<endif><struct.derivedFromName; format="cap">(this);
 }
};


>>


VisitorDispatchMethod(method) ::= <<
<struct.name>.prototype.accept = function(visitor) {
   if ( visitor instanceof <parser.grammarName>Visitor ) {
       return visitor.visit<struct.derivedFromName; format="cap">(this);
   } else {
       return visitor.visitChildren(this);
   }
};


>>


AttributeDecl(d) ::= "this.<d.name> = <if(d.initValue)><d.initValue><else>null<endif>"
```

/** If we don't know location of label def x, use this template */
labelref(x) ::= "<if(!x.isLocal)>localctx.<endif><x.name>"

/** For any action chunk, what is correctly-typed context struct ptr? */
ctx(actionChunk) ::= "localctx"

// used for left-recursive rules
recRuleAltPredicate(ruleName,opPrec) ::= "this.precpred(this._ctx, <opPrec>)"
recRuleSetReturnAction(src,name)   ::= "$<name>=$<src>.<name>"
recRuleSetStopToken()   ::= "this._ctx.stop = this._input.LT(-1);"

recRuleAltStartAction(ruleName, ctxName, label) ::= <<
localctx = new <ctxName>Context(this, _parentctx, _parentState);
<if(label)>localctx.<label> = _prevctx;<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleLabeledAltStartAction(ruleName, currentAltLabel, label, isListLabel) ::= <<
localctx = new <currentAltLabel; format="cap">Context(this, new <ruleName; format="cap">Context(this,
_parentctx, _parentState));
<if(label)>
<if(isListLabel)>
localctx.<label>.push(_prevctx);
<else>
localctx.<label> = _prevctx;
<endif>
<endif>
this.pushNewRecursionContext(localctx, _startState, <parser.name>.RULE_<ruleName>);
>>

recRuleReplaceContext(ctxName) ::= <<
localctx = new <ctxName>Context(this, localctx);
this._ctx = localctx;
_prevctx = localctx;
>>

recRuleSetPrevCtx() ::= <<
if(this._parseListeners!==null) {
   this.triggerExitRuleEvent();
}
_prevctx = localctx;
>>

LexerFile(lexerFile, lexer, namedActions) ::= <<
<fileHeader(lexerFile.grammarFileName, lexerFile.ANTLRVersion)>
var antlr4 = require('antlr4/index');
>>

```
<namedActions.header>

<lexer>

>>

Lexer(lexer, atn, actionFuncs, sempredFuncs, superClass) ::= <<
<if(superClass)>
var <superClass> = require('./<superClass>').<superClass>;
<endif>

<atn>

var atn = new antlr4.atn.ATNDeserializer().deserialize(serializedATN);

var decisionsToDFA = atn.decisionToState.map( function(ds, index) { return new antlr4.dfa.DFA(ds, index); });

function <lexer.name>(input) {
 <if(superClass)><superClass><else>antlr4.Lexer<endif>.call(this, input);
   this._interp = new antlr4.atn.LexerATNSimulator(this, atn, decisionsToDFA, new
antlr4.PredictionContextCache());
 <namedActions.members>
   return this;
}

<lexer.name>.prototype = Object.create(<if(superClass)><superClass><else>antlr4.Lexer<endif>.prototype);
<lexer.name>.prototype.constructor = <lexer.name>;

Object.defineProperty(<lexer.name>.prototype, "atn", {
    get : function() {
        return atn;
    }
});

<lexer.name>.EOF = antlr4.Token.EOF;
<lexer.tokens:{k | <lexer.name>.<k> = <lexer.tokens.(k)>;}; separator="\n", wrap, anchor>

<if(lexer.channels)>
<lexer.channels:{c| <lexer.name>.<c> = <lexer.channels.(c)>;}; separator="\n">

<endif>
<if(rest(lexer.modes))>
<rest(lexer.modes):{m| <lexer.name>.<m> = <i>;}; separator="\n">

<endif>
<lexer.name>.prototype.channelNames = [ "DEFAULT_TOKEN_CHANNEL", "HIDDEN"<if (lexer.channels)>,
<lexer.channels:{c| "<c>"}; separator=", ", wrap, anchor><endif> ];
```

```
<lexer.name>.prototype.modeNames = [ <lexer.modes:{m| "<m>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.literalNames = [ <lexer.literalNames:{t | <t>}; null="null", separator=", ", wrap, anchor> ];

<lexer.name>.prototype.symbolicNames = [ <lexer.symbolicNames:{t | <t>}; null="null", separator=", ", wrap,
anchor> ];

<lexer.name>.prototype.ruleNames = [ <lexer.ruleNames:{r | "<r>"}; separator=", ", wrap, anchor> ];

<lexer.name>.prototype.grammarFileName = "<lexer.grammarFileName>";

<dumpActions(lexer, "", actionFuncs, sempredFuncs)>

exports.<lexer.name> = <lexer.name>;

>>

SerializedATN(model) ::= <<
<! only one segment, can be inlined !>

var serializedATN = ["<model.serialized; wrap={",<\n>    "}>"].join("");

>>

/** Using a type to init value map, try to init a type; if not in table
 * must be an object, default value is "null".
 */
initValue(typeName) ::= <<
<javacriptTypeInitMap.(typeName)>
>>

codeFileExtension() ::= ".js"

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-
jar/org/antlr/v4/tool/templates/codegen/JavaScript/JavaScript.stg
No license file was found, but licenses were detected in source scan.

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 */

/** templates used to generate make-compatible dependencies */

/** Generate "f : x, y, z" dependencies for input
 * dependencies and generated files. in and out
 * are File objects.  For example, you can say
 * <f.canonicalPath>
 */
dependencies(grammarFileName,in,out) ::= <<
<if(in)><grammarFileName>: <in; separator=", "><endif>
<out:{f | <f> : <grammarFileName>}; separator="\n">
>>
```

Found in path(s):
* /opt/cola/permits/1192255793_1629156080.64/0/antlr4-4-8-1-sources-1-jar/org/antlr/v4/tool/templates/depend.stg

1.316 apache-log4j 2.17.1

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1.317 jackson-datatype-jsr310 2.13.3

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1.318 jackson-databind 2.13.3

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1.319 brianm's-jdbi 2.78

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jar/org/skife/jdbi/v2/SqlDateArgument.java

* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
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* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-jar/org/skife/jdbi/v2/Binding.java
* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
jar/org/skife/jdbi/v2/sqlobject/SqlBatch.java
* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
jar/org/skife/jdbi/v2/exceptions/TransactionException.java
* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
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* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
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* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
jar/org/skife/jdbi/v2/sqlobject/GetGeneratedKeys.java
* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
jar/org/skife/jdbi/v2/StringArgument.java
* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
jar/org/skife/jdbi/v2/tweak/transactions/SerializableTransactionRunner.java
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* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-
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jar/org/skife/jdbi/v2/tweak/ArgumentFactory.java

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jar/org/skife/jdbi/v2/ResultColumnMapperFactory.java
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jar/org/skife/jdbi/v2/unstable/package.html

* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-jar/org/skife/jdbi/v2/tweak/package.html

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* /opt/cola/permits/1274703408_1658978997.4111104/0/jdbi-2-78-sources-1-jar/org/skife/jdbi/v2/unstable/oracle/package.html

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1.320 google-guice 5.0.1

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1.321 user-type 7.0.0.CR1

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* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/DstSafeTimeType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/descriptor/sql/DstSafeDateTypeDescriptor.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/DstSafeDateType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/descriptor/sql/DstSafeTimeTypeDescriptor.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/DstSafeTimestampType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/descriptor/sql/DstSafeTimestampTypeDescriptor.java
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```
/*
```

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* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractParameterizedTemporalUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/ColumnMapperSingleColumnTypeAdapter.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractParameterizedUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractHeuristicUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractBigDecimalColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractKnownClassHeuristicUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractReflectionUserType.java
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Found in path(s):
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/utils/lang/IterableEnumeration.java
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jar/org/jadira/usertype/spi/shared/AbstractMultiColumnUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractLongColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/utils/reflection/ArrayUtils.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/JvmTimestampSeed.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/utils/reflection/ReflectionException.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractTimestampColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractDateColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractVersionableLongColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/VersionableColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/AbstractVersionableTimestampColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/shared/ColumnMapper.java

* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/utils/reflection/ClassLoaderUtils.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/utils/reflection/TypeHelper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractIntegerColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractBigIntegerColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/DbTimestampSeed.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/Seed.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractSingleColumnUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractVersionableUserType.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractTimeColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractStringColumnMapper.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/shared/AbstractVersionableBigIntegerColumnMapper.java
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* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/repository/SearchRepository.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/repository/JpaBaseRepository.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-jar/org/jadira/usertype/spi/utils/lang/AssertionException.java
* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-

jar/org/jadira/usertype/spi/repository/BaseRepository.java

* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/utils/reflection/ReflectionUtils.java

* /opt/cola/permits/1354022522_1656694692.3150113/0/usertype-spi-7-0-0-cr1-sources-
jar/org/jadira/usertype/spi/repository/JpaSearchRepository.java

1.322 metrics---dropwizard v4.0.5

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Manifest-Version: 1.0

Bnd-LastModified: 1545937975057

Build-Jdk: 1.8.0_191

Built-By: artem

Bundle-Description: An Apache HttpClient wrapper providing Metrics ins

trumentation of connection pools, request   durations and rates,

 and other useful information.

Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html

Bundle-ManifestVersion: 2

Bundle-Name: Metrics Integration for Apache HttpClient

Bundle-SymbolicName: io.dropwizard.metrics.httpclient

Bundle-Version: 4.0.5

Created-By: Apache Maven Bundle Plugin

Export-Package: com.codahale.metrics.httpclient;uses:="com.codahale.me

trics,org.apache.http,org.apache.http.config,org.apache.http.conn,org

.apache.http.conn.routing,org.apache.http.conn.socket,org.apache.http

.impl.client,org.apache.http.impl.conn,org.apache.http.protocol";vers

ion="4.0.5"

Implementation-Title: Metrics Integration for Apache HttpClient

Implementation-URL: http://metrics.dropwizard.io/metrics-httpclient

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: com.codahale.metrics;version="[4.0,5)",org.apache.http

,org.apache.http.client,org.apache.http.client.methods,org.apache.htt

p.client.utils,org.apache.http.config,org.apache.http.conn,org.apache

.http.conn.routing,org.apache.http.conn.socket,org.apache.http.conn.s

sl,org.apache.http.impl.client,org.apache.http.impl.conn,org.apache.h

ttp.pool,org.apache.http.protocol

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274705442_1648835835.08/0/metrics-httpclient-4-0-5-jar/META-INF/MANIFEST.MF

1.323 dropwizard-metrics-support 1.3.23

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1.324 jackson-module-parameter-names 2.10.3

1.324.1 Available under license :

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1.325 google-guava v28.0

1.325.1 Available under license :

Doug Lea

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1.326 dropwizard-logging-support 1.3.23

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1.327 jul-to-slf4j-bridge 1.7.25

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1.328 jackson-jaxrs-base 2.10.2

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1.329 quartz-job-scheduler 2.3.2

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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/spi/JobStore.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/impl/calendar/WeeklyCalendar.java

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jar/org/quartz/impl/calendar/MonthlyCalendar.java

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jar/org/quartz/ee/servlet/QuartzInitializerListener.java

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jar/org/quartz/impl/calendar/BaseCalendar.java

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jar/org/quartz/impl/DirectSchedulerFactory.java

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jar/org/quartz/utils/PoolingConnectionProvider.java

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jar/org/quartz/ee/servlet/QuartzInitializerServlet.java

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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/SimpleScheduleBuilder.java

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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/TimeOfDay.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/JobBuilder.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/ExecuteInJTATransaction.java

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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/TriggerBuilder.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/JobExecutionException.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/matchers/NotMatcher.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/matchers/StringMatcher.java

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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/CalendarIntervalScheduleBuilder.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/triggers/CalendarIntervalTriggerImpl.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/DailyTimeIntervalTriggerPersistenceDelegate.java

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jar/org/quartz/impl/jdbcjobstore/TablePrefixAware.java

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jar/org/quartz/impl/jdbcjobstore/AttributeRestoringConnectionInvocationHandler.java

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jar/org/quartz/listeners/JobListenerSupport.java

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jar/org/quartz/listeners/SchedulerListenerSupport.java

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jar/org/quartz/utils/StringKeyDirtyFlagMap.java

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jar/org/quartz/plugins/SchedulerPluginWithUserTransactionSupport.java

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jar/org/quartz/impl/jdbcjobstore/TriggerPersistenceDelegate.java
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jar/org/quartz/management/ManagementServer.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/management/ManagementRESTServiceConfiguration.java
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jar/org/terracotta/quartz/collections/SerializationHelper.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/collections/TimeTrigger.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/xml/ValidationException.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/impl/jdbcjobstore/MSSQLDelegate.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/ee/jta/JTAAnnotationAwareJobRunShellFactory.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/helpers/VersionPrinter.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/spi/SchedulerSignaler.java
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jar/org/quartz/core/RemotableQuartzScheduler.java
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jar/org/quartz/ee/jmx/jboss/QuartzService.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/calendar/HolidayCalendar.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/DB2v8Delegate.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/FiredTriggerRecord.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/utils/JNDIConnectionProvider.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/SchedulerMetaData.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/spi/SchedulerPlugin.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/StdJDBCConstants.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/Trigger.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/DB2v7Delegate.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/SchedulerListener.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/JobDataMap.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/impl/jdbcjobstore/oracle/weblogic/WebLogicOracleDelegate.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/C3p0PoolingConnectionProvider.java
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jar/org/quartz/impl/JobExecutionContextImpl.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/wrappers/TriggerFacade.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/PlainTerracottaJobStore.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/ClusteredJobStore.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/TerracottaJobStoreExtensions.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/CircularLossyQueue.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/utils/counter/Counter.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledCounterConfig.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/CounterConfig.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledRateCounterImpl.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledRateCounterConfig.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/CounterImpl.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledCounterImpl.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/TimeStampedCounterValue.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledRateCounter.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/CounterManagerImpl.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/CounterManager.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/utils/counter/sampled/SampledCounter.java
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jar/org/terracotta/quartz/DefaultClusteredJobStore.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/terracotta/quartz/collections/SerializedToolkitStore.java
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* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/listeners/BroadcastTriggerListener.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/impl/jdbcjobstore/UpdateLockRowSemaphore.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/listeners/JobChainingJobListener.java
* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-
jar/org/quartz/listeners/BroadcastJobListener.java

* /opt/cola/permits/1112432772_1615201079.25/0/quartz-2-3-2-sources-1-jar/org/quartz/plugins/interrupt/JobInterruptMonitorPlugin.java

1.330 jaxen 1.2.0

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* /opt/cola/permits/1274701418_1650417730.37/0/jsonpath-2-11-0-6-9-sources-
jar/io/gatling/jsonpath/ComparisonOperators.scala
* /opt/cola/permits/1274701418_1650417730.37/0/jsonpath-2-11-0-6-9-sources-jar/io/gatling/jsonpath/AST.scala
* /opt/cola/permits/1274701418_1650417730.37/0/jsonpath-2-11-0-6-9-sources-jar/io/gatling/jsonpath/Parser.scala
* /opt/cola/permits/1274701418_1650417730.37/0/jsonpath-2-11-0-6-9-sources-
jar/io/gatling/jsonpath/JsonPath.scala

1.332 asm-commons 9.1

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Manifest-Version: 1.0
Bundle-DocURL: http://asm.ow2.org
Bundle-License: BSD-3-Clause;link=https://asm.ow2.io/LICENSE.txt
Bundle-ManifestVersion: 2
Bundle-Name: org.objectweb.asm.commons
Bundle-RequiredExecutionEnvironment: J2SE-1.5
Bundle-SymbolicName: org.objectweb.asm.commons
Bundle-Version: 9.1.0
Export-Package: org.objectweb.asm.commons;version="9.1";uses:="org.obj
ectweb.asm,org.objectweb.asm.signature,org.objectweb.asm.tree"
Implementation-Title: Usefull class adapters based on ASM, a very smal
l and fast Java bytecode manipulation framework
Implementation-Version: 9.1
Import-Package: org.objectweb.asm;version="[9.1,10)",org.objectweb.asm
.signature;version="[9.1,10)",org.objectweb.asm.tree;version="[9.1,10
)"
Module-Requires: org.objectweb.asm;transitive=true,org.objectweb.asm.t
ree;transitive=true,org.objectweb.asm.tree.analysis;transitive=true

Found in path(s):

* /opt/cola/permits/1183889887_1627494130.56/0/asm-commons-9-1-jar/META-INF/MANIFEST.MF

1.333 junit 4.12

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1.335 testcontainers-elasticsearch 1.17.6

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1.336 duct-tape 1.0.8

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1.337 elasticsearch-java-client 8.4.3

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1.340 kotlin 1.2.40

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(root, factory) {\n   if (typeof define === 'function' && define.amd) {\n   define('kotlin', ['exports'], factory);\n   }\n   else if (typeof exports === 'object') {\n   factory(module.exports);\n   }\n   else {\n   root.kotlin = {};\n   factory(root.kotlin);\n   }\n}(this, function (Kotlin) {\n   var _ = Kotlin;\n\n   insertContent();\n}));\n","/*\n *\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing,\n software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES\n OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language\n governing permissions and\n * limitations under the License.\n */\n\nKotlin.toShort = function (a) {\n   return (a &\n 0xFFFF) << 16 >> 16;\n};\n\nKotlin.toByte = function (a) {\n   return (a & 0xFF) << 24 >>\n 24;\n};\n\nKotlin.toChar = function (a) {\n   return a & 0xFFFF;\n};\n\nKotlin.numberToLong = function (a) {\n

return a instanceof Kotlin.Long ? a : Kotlin.Long.fromNumber(a);\n};\n\nKotlin.numberToInt = function (a) {\n return a instanceof Kotlin.Long ? a.toInt() : Kotlin.doubleToInt(a);\n};\n\nKotlin.numberToShort = function (a) {\n return Kotlin.toShort(Kotlin.numberToInt(a));\n};\n\nKotlin.numberToByte = function (a) {\n return Kotlin.toByte(Kotlin.numberToInt(a));\n};\n\nKotlin.numberToDouble = function (a) {\n return +a;\n};\n\nKotlin.numberToChar = function (a) {\n return Kotlin.toChar(Kotlin.numberToInt(a));\n};\n\nKotlin.doubleToInt = function(a) {\n if (a > 2147483647) return 2147483647;\n if (a < -2147483648) return -2147483648;\n return a | 0;\n};\n\nKotlin.toBoxedChar = function (a) {\n if (a == null) return a;\n if (a instanceof Kotlin.BoxedChar) return a;\n return new Kotlin.BoxedChar(a);\n};\n\nKotlin.unboxChar = function(a) {\n if (a == null) return a;\n return Kotlin.toChar(a);\n};\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nKotlin.compareTo = function (a, b) {\n var typeA = typeof a;\n if (typeA === \"number\") {\n   if (typeof b === \"number\") {\n   return Kotlin.doubleCompareTo(a, b);\n   }\n   return Kotlin.primitiveCompareTo(a, b);\n }\n if (typeA === \"string\" || typeA === \"boolean\") {\n   return Kotlin.primitiveCompareTo(a, b);\n }\n return a.compareTo_11rb$(b);\n};\n\nKotlin.primitiveCompareTo = function (a, b) {\n return a < b ? -1 : a > b ? 1 : 0;\n};\n\nKotlin.doubleCompareTo = function (a, b) {\n if (a < b) return -1;\n if (a > b) return 1;\n\n if (a === b) {\n   if (a !== 0) return 0;\n\n   var ia = 1 / a;\n   return ia === 1 / b ? 0 : (ia < 0 ? -1 : 1);\n }\n\n return a !== a ? (b !== b ? 0 : 1) : -1\n};\n\nKotlin.charInc = function (value) {\n return Kotlin.toChar(value+1);\n};\n\nKotlin.charDec = function (value) {\n return Kotlin.toChar(value-1);\n};\n\nKotlin.imul = Math.imul || imul;\n\nKotlin.imulEmulated = imul;\n\nfunction imul(a, b) {\n return ((a & 0xffff0000) * (b & 0xffff) + (a & 0xffff) * (b | 0)) | 0;\n}\n\n(function() {\n var buf = new ArrayBuffer(8);\n var bufFloat64 = new Float64Array(buf);\n var bufFloat32 = new Float32Array(buf);\n var bufInt32 = new Int32Array(buf);\n var lowIndex = 0;\n var highIndex = 1;\n\n bufFloat64[0] = -1; // bff00000_00000000\n if (bufInt32[lowIndex] !== 0) {\n   lowIndex = 1;\n   highIndex = 0;\n }\n\n Kotlin.doubleToBits = function(value) {\n   return Kotlin.doubleToRawBits(isNaN(value) ? NaN : value);\n };\n\n Kotlin.doubleToRawBits = function(value) {\n   bufFloat64[0] = value;\n   return Kotlin.Long.fromBits(bufInt32[lowIndex], bufInt32[highIndex]);\n };\n\n Kotlin.doubleFromBits = function(value) {\n   bufInt32[lowIndex] = value.low_;\n   bufInt32[highIndex] = value.high_;\n   return bufFloat64[0];\n };\n\n Kotlin.floatToBits = function(value) {\n   return Kotlin.floatToRawBits(isNaN(value) ? NaN : value);\n };\n\n Kotlin.floatToRawBits = function(value) {\n   bufFloat32[0] = value;\n   return bufInt32[0];\n };\n\n Kotlin.floatFromBits = function(value) {\n   bufInt32[0] = value;\n   return bufFloat32[0];\n };\n\n // returns zero value for number with positive sign bit and non-zero value for number with negative sign bit.\n Kotlin.doubleSignBit = function(value) {\n   bufFloat64[0] = value;\n   return bufInt32[highIndex] & 0x80000000;\n };\n\n Kotlin.numberHashCode = function(obj) {\n   if ((obj | 0) === obj) {\n   return obj | 0;\n   }\n   else {\n   bufFloat64[0] = obj;\n   return (bufInt32[highIndex] * 31 | 0) + bufInt32[lowIndex] | 0;\n   }\n }\n})();\n\nKotlin.ensureNotNull = function(x) {\n return x != null ? x : Kotlin.throwNPE();\n};\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nKotlin.equals = function (obj1, obj2) {\n if (obj1 == null) {\n   return obj2 == null;\n }\n\n if (obj2 == null) {\n   return false;\n }\n\n if (obj1 !== obj1) {\n   return obj2 !== obj2;\n }\n\n if (typeof obj1 === \"object\" &&

typeof obj1.equals === \"function\") {\n   return obj1.equals(obj2);\n   }\n\n   if (typeof obj1 === \"number\" && typeof obj2 === \"number\") {\n   return obj1 === obj2 && (obj1 !== 0 || 1 / obj1 === 1 / obj2)\n   }\n\n   return obj1 === obj2;\n};\n\nKotlin.hashCode = function (obj) {\n   if (obj == null) {\n   return 0;\n   }\n   var objType = typeof obj;\n   if (\"object\" === objType) {\n   return \"function\" === typeof obj.hashCode ? obj.hashCode() : getObjectHashCode(obj);\n   }\n   if (\"function\" === objType) {\n   return getObjectHashCode(obj);\n   }\n   if (\"number\" === objType) {\n   return Kotlin.numberHashCode(obj);\n   }\n   if (\"boolean\" === objType) {\n   return Number(obj)\n   }\n\n   var str = String(obj);\n   return getStringHashCode(str);\n};\n\n\nKotlin.toString = function (o) {\n   if (o == null) {\n   return \"null\";\n   }\n else if (Kotlin.isArrayish(o)) {\n   return \"[...]\";\n   }\n else {\n   return o.toString();\n   }\n};\n\n/**\n @const */\nvar POW_2_32 = 4294967296;\n\n// TODO: consider switching to Symbol type once we are on ES6.\n/**\n @const */\nvar OBJECT_HASH_CODE_PROPERTY_NAME = \"kotlinHashCodeValue$\";\n\nfunction getObjectHashCode(obj) {\n   if (!(OBJECT_HASH_CODE_PROPERTY_NAME in obj)) {\n   var hash = (Math.random() * POW_2_32) | 0; // Make 32-bit singed integer.\n   Object.defineProperty(obj, OBJECT_HASH_CODE_PROPERTY_NAME, { value: hash, enumerable: false });\n   }\n   return obj[OBJECT_HASH_CODE_PROPERTY_NAME];\n}\n\nfunction getStringHashCode(str) {\n   var hash = 0;\n   for (var i = 0; i < str.length; i++) {\n   var code = str.charCodeAt(i);\n   hash = (hash * 31 + code) | 0; // Keep it 32-bit.\n   }\n   return hash;\n}\n\nKotlin.identityHashCode = getObjectHashCode;\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nKotlin.isBooleanArray = function (a) {\n   return (Array.isArray(a) || a instanceof Int8Array) && a.$type$ === \"BooleanArray\"\n};\n\nKotlin.isByteArray = function (a) {\n   return a instanceof Int8Array && a.$type$!== \"BooleanArray\"\n};\n\nKotlin.isShortArray = function (a) {\n   return a instanceof Int16Array\n};\n\nKotlin.isCharArray = function (a) {\n   return a instanceof Uint16Array && a.$type$ === \"CharArray\"\n};\n\nKotlin.isIntArray = function (a) {\n   return a instanceof Int32Array\n};\n\nKotlin.isFloatArray = function (a) {\n   return a instanceof Float32Array\n};\n\nKotlin.isDoubleArray = function (a) {\n   return a instanceof Float64Array\n};\n\nKotlin.isLongArray = function (a) {\n   return Array.isArray(a) && a.$type$ === \"LongArray\"\n};\n\nKotlin.isArray = function (a) {\n   return Array.isArray(a) && !a.$type$;\n};\n\nKotlin.isArrayish = function (a) {\n   return Array.isArray(a) || ArrayBuffer.isView(a)\n};\n\nKotlin.arrayToString = function (a) {\n   var toString = Kotlin.isCharArray(a) ? String.fromCharCode : Kotlin.toString;\n   return \"[\" + Array.prototype.map.call(a, function(e) { return toString(e); }).join(\", \") + \"]\";\n};\n\nKotlin.arrayDeepToString = function (a, visited) {\n   visited = visited || [a];\n   var toString = Kotlin.isCharArray(a) ? String.fromCharCode : Kotlin.toString;\n   return \"[\" + Array.prototype.map.call(a, function (e) {\n   if (Kotlin.isArrayish(e) && visited.indexOf(e) < 0) {\n   visited.push(e);\n   var result = Kotlin.arrayDeepToString(e, visited);\n   visited.pop();\n   return result;\n   }\n   else {\n   return toString(e);\n   }\n   }).join(\", \") + \"]\";\n};\n\nKotlin.arrayEquals = function (a, b) {\n   if (a === b) {\n   return true;\n   }\n   if (!Kotlin.isArrayish(b) || a.length !== b.length) {\n   return false;\n   }\n\n   for (var i = 0, n = a.length; i < n; i++) {\n   if (!Kotlin.equals(a[i], b[i])) {\n   return false;\n   }\n   }\n   return true;\n};\n\nKotlin.arrayDeepEquals = function (a, b) {\n   if (a === b) {\n   return true;\n   }\n   if (!Kotlin.isArrayish(b) || a.length !== b.length) {\n   return false;\n   }\n\n   for (var i = 0, n = a.length; i < n; i++) {\n   if (Kotlin.isArrayish(a[i])) {\n   if (!Kotlin.arrayDeepEquals(a[i], b[i])) {\n   return false;\n   }\n   }\n   else if (!Kotlin.equals(a[i], b[i])) {\n   return false;\n   }\n   }\n   return true;\n};\n\nKotlin.arrayHashCode = function (arr) {\n   var result = 1;\n   for (var i = 0, n = arr.length; i < n; i++) {\n   result = ((31 * result | 0) + Kotlin.hashCode(arr[i])) | 0;\n   }\n   return

result;\n};\n\nKotlin.arrayDeepHashCode = function (arr) {\n   var result = 1;\n   for (var i = 0, n = arr.length; i < n; i++) {\n   var e = arr[i];\n   result = ((31 * result | 0) + (Kotlin.isArrayish(e) ? Kotlin.arrayDeepHashCode(e) : Kotlin.hashCode(e))) | 0;\n   }\n   return result;\n};\n\nKotlin.primitiveArraySort = function (array) {\n   array.sort(Kotlin.doubleCompareTo)\n};\n","/*\n * Copyright 2010-2014 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nKotlin.getCallableRef = function(name, f) {\n   f.callableName = name;\n   return f;\n};\n\nKotlin.getPropertyCallableRef = function(name, paramCount, getter, setter) {\n   getter.get = getter;\n   getter.set = setter;\n   getter.callableName = name;\n   return getPropertyRefClass(getter, setter, propertyRefClassMetadataCache[paramCount]);\n};\n\nfunction getPropertyRefClass(obj, setter, cache) {\n   obj.$metadata$ = getPropertyRefMetadata(typeof setter === \"function\" ? cache.mutable : cache.immutable);\n   obj.constructor = obj;\n   return obj;\n}\n\nvar propertyRefClassMetadataCache = [\n   {\n   mutable: { value: null, implementedInterface: function () {\n   return Kotlin.kotlin.reflect.KMutableProperty0 }\n   },\n   immutable: { value: null, implementedInterface: function () {\n   return Kotlin.kotlin.reflect.KProperty0 }\n   },\n   {\n   mutable: { value: null, implementedInterface: function () {\n   return Kotlin.kotlin.reflect.KMutableProperty1 }\n   },\n   immutable: { value: null, implementedInterface: function () {\n   return Kotlin.kotlin.reflect.KProperty1 }\n   }\n   }];\n\nfunction getPropertyRefMetadata(cache) {\n   if (cache.value === null) {\n   cache.value = {\n   interfaces: [cache.implementedInterface()],\n   baseClass: null,\n   functions: {},\n   properties: {},\n   types: {},\n   staticMembers: {}\n   };\n   }\n   return cache.value;\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nif (typeof String.prototype.startsWith === \"undefined\") {\n   String.prototype.startsWith = function(searchString, position) {\n   position = position || 0;\n   return this.lastIndexOf(searchString, position) === position;\n   };\n}\nif (typeof String.prototype.endsWith === \"undefined\") {\n   String.prototype.endsWith = function(searchString, position) {\n   var subjectString = this.toString();\n   if (position === undefined || position > subjectString.length) {\n   position = subjectString.length;\n   }\n   position -= searchString.length;\n   var lastIndex = subjectString.indexOf(searchString, position);\n   return lastIndex !== -1 && lastIndex === position;\n   };\n}\n// ES6 Math polyfills\nif (typeof Math.sign === \"undefined\") {\n   Math.sign = function(x) {\n   x = +x; // convert to a number\n   if (x === 0 || isNaN(x)) {\n   return Number(x);\n   }\n   return x > 0 ? 1 : -1;\n   };\n}\nif (typeof Math.trunc === \"undefined\") {\n   Math.trunc = function(x) {\n   if (isNaN(x)) {\n   return NaN;\n   }\n   if (x > 0) {\n   return Math.floor(x);\n   }\n   return Math.ceil(x);\n   };\n}\n\n(function() {\n   var epsilon = 2.220446049250313E-16;\n   var taylor_2_bound = Math.sqrt(epsilon);\n   var taylor_n_bound = Math.sqrt(taylor_2_bound);\n   var upper_taylor_2_bound = 1/taylor_2_bound;\n   var upper_taylor_n_bound = 1/taylor_n_bound;\n\n   if (typeof Math.sinh === \"undefined\") {\n   Math.sinh = function(x) {\n   if (Math.abs(x) < taylor_n_bound) {\n   var result = x;\n   if (Math.abs(x) > taylor_2_bound) {\n   result += (x * x * x) / 6;\n   }\n   return result;\n   } else {\n   var y = Math.exp(x);\n   var y1 = 1 / y;\n   if (!isFinite(y)) return Math.exp(x - Math.LN2);\n   if (!isFinite(y1)) return -Math.exp(-x - Math.LN2);\n   return (y - y1) / 2;\n   }\n   };\n   }\n   if (typeof Math.cosh === \"undefined\") {\n   Math.cosh = function(x) {\n   var y = Math.exp(x);\n   var y1 = 1 / y;\n   if (!isFinite(y) || !isFinite(y1)) return Math.exp(Math.abs(x) - Math.LN2);\n   return (y + y1) / 2;\n   };\n   }\n\n   if (typeof Math.tanh ===

\"undefined\") {\n   Math.tanh = function(x){\n   if (Math.abs(x) < taylor_n_bound) {\n   var result = x;\n   if (Math.abs(x) > taylor_2_bound) {\n   result -= (x * x * x) / 3;\n   }\n\n return result;\n   }\n   else {\n   var a = Math.exp(+x), b = Math.exp(-x);\n   return a === Infinity ? 1 : b === Infinity ? -1 : (a - b) / (a + b);\n   }\n   };\n   }\n\n   // Inverse hyperbolic function implementations derived from boost special math functions,\n   // Copyright Eric Ford & Hubert Holin 2001.\n\n if (typeof Math.asinh === \"undefined\") {\n   var asinh = function(x) {\n   if (x >= +taylor_n_bound)\n   {\n   if (x > upper_taylor_n_bound)\n   {\n   if (x > upper_taylor_2_bound)\n {\n   // approximation by laurent series in 1/x at 0+ order from -1 to 0\n   return Math.log(x) + Math.LN2;\n   }\n   else\n   {\n   // approximation by laurent series in 1/x at 0+ order from -1 to 1\n   return Math.log(x * 2 + (1 / (x * 2)));\n   }\n   }\n   else\n   {\n   return Math.log(x + Math.sqrt(x * x + 1));\n   }\n   }\n   else if (x <= -taylor_n_bound)\n   {\n   return -asinh(-x);\n   }\n   else\n {\n   // approximation by taylor series in x at 0 up to order 2\n   var result = x;\n   if (Math.abs(x) >= taylor_2_bound)\n   {\n   var x3 = x * x * x;\n   // approximation by taylor series in x at 0 up to order 4\n   result -= x3 / 6;\n   }\n   return result;\n   }\n   };\n   Math.asinh = asinh;\n   }\n   if (typeof Math.acosh === \"undefined\") {\n   Math.acosh = function(x)\n {\n   if (x < 1)\n   {\n   return NaN;\n   }\n   else if (x - 1 >= taylor_n_bound)\n   {\n   if (x > upper_taylor_2_bound)\n   {\n   // approximation by laurent series in 1/x at 0+ order from -1 to 0\n   return Math.log(x) + Math.LN2;\n   }\n   else\n   {\n   return Math.log(x + Math.sqrt(x * x - 1));\n   }\n   }\n   else\n   {\n   var y = Math.sqrt(x - 1);\n   // approximation by taylor series in y at 0 up to order 2\n   var result = y;\n   if (y >= taylor_2_bound)\n   {\n   var y3 = y * y * y;\n   // approximation by taylor series in y at 0 up to order 4\n   result -= y3 / 12;\n   }\n\n   return Math.sqrt(2) * result;\n   }\n   };\n   }\n   if (typeof Math.atanh === \"undefined\") {\n   Math.atanh = function(x) {\n   if (Math.abs(x) < taylor_n_bound) {\n   var result = x;\n   if (Math.abs(x) > taylor_2_bound) {\n   result += (x * x * x) / 3;\n   }\n   return result;\n   }\n   return Math.log((1 + x) / (1 - x)) / 2;\n   };\n   }\n   if (typeof Math.log1p === \"undefined\") {\n   Math.log1p = function(x) {\n   if (Math.abs(x) < taylor_n_bound) {\n   var x2 = x * x;\n   var x3 = x2 * x;\n   var x4 = x3 * x;\n   // approximation by taylor series in x at 0 up to order 4\n   return (-x4 / 4 + x3 / 3 - x2 / 2 + x);\n   }\n   return Math.log(x + 1);\n   };\n   }\n   if (typeof Math.expm1 === \"undefined\") {\n   Math.expm1 = function(x) {\n   if (Math.abs(x) < taylor_n_bound) {\n   var x2 = x * x;\n   var x3 = x2 * x;\n   var x4 = x3 * x;\n   // approximation by taylor series in x at 0 up to order 4\n   return (x4 / 24 + x3 / 6 + x2 / 2 + x);\n   }\n   return Math.exp(x) - 1;\n   };\n   }\n})();\nif (typeof Math.hypot === \"undefined\") {\n   Math.hypot = function() {\n   var y = 0;\n   var length = arguments.length;\n\n   for (var i = 0; i < length; i++) {\n   if (arguments[i] === Infinity || arguments[i] === -Infinity) {\n   return Infinity;\n   }\n   y += arguments[i] * arguments[i];\n   }\n   return Math.sqrt(y);\n   };\n}\nif (typeof Math.log10 === \"undefined\") {\n   Math.log10 = function(x) {\n   return Math.log(x) * Math.LOG10E;\n   };\n}\nif (typeof Math.log2 === \"undefined\") {\n   Math.log2 = function(x) {\n   return Math.log(x) * Math.LOG2E;\n   };\n}\n\n\n// For HtmlUnit and PhantomJs\nif (typeof ArrayBuffer.isView === \"undefined\") {\n   ArrayBuffer.isView = function(a) {\n   return a != null && a.__proto__ != null && a.__proto__.__proto__ === Int8Array.prototype.__proto__;\n   };\n}\n\n\n(function() {\n   function normalizeOffset(offset, length) {\n   if (offset < 0) return Math.max(0, offset + length);\n   return Math.min(offset, length);\n   }\n   function typedArraySlice(begin, end) {\n   if (typeof end === \"undefined\")\n   {\n   end = this.length;\n   }\n   begin = normalizeOffset(begin || 0, this.length);\n   end = Math.max(begin, normalizeOffset(end, this.length));\n   return new this.constructor(this.subarray(begin, end));\n   }\n\n   var arrays = [Int8Array, Int16Array, Uint16Array, Int32Array, Float32Array, Float64Array];\n   for (var i = 0; i < arrays.length; ++i) {\n   var TypedArray = arrays[i];\n   if (typeof TypedArray.prototype.slice === \"undefined\") {\n   Object.defineProperty(TypedArray.prototype, 'slice', {\n   value:

typedArraySlice\n   });\n   }\n   }\n\n   // Patch apply to work with TypedArrays if needed.\n   try {\n (function() { }).apply(null, new Int32Array(0))\n   } catch (e) {\n   var apply = Function.prototype.apply;\n Object.defineProperty(Function.prototype, 'apply', {\n   value: function(self, array) {\n   return apply.call(this, self, [].slice.call(array));\n   }\n   });\n   }\n\n\n   // Patch map to work with TypedArrays if needed.\n   for (var i = 0; i < arrays.length; ++i) {\n   var TypedArray = arrays[i];\n   if (typeof TypedArray.prototype.map === \"undefined\") {\n   Object.defineProperty(TypedArray.prototype, 'map', {\n   value: function(callback, self) {\n   return [].slice.call(this).map(callback, self);\n   }\n   });\n   }\n   }\n\n   // Patch sort to work with TypedArrays if needed.\n   for (var i = 0; i < arrays.length; ++i) {\n   var TypedArray = arrays[i];\n   if (typeof TypedArray.prototype.sort === \"undefined\") {\n Object.defineProperty(TypedArray.prototype, 'sort', {\n   value: function(compareFunction) {\n   return Array.prototype.sort.call(this, compareFunction);\n   }\n   });\n   }\n   }\n})();\n","/*\n * Copyright 2010-2013 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// Copyright 2009 The Closure Library Authors. 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For operations like addition and\n * multiplication, we split each number into 16-bit pieces, which can\n * easily be\n * multiplied within Javascript's floating-point representation without overflow\n * or change in sign.\n *\n * In the algorithms below, we frequently reduce the negative case to the\n * positive case by negating the input(s) and then post-processing the result.\n * Note that we must ALWAYS check specially whether those values are MIN_VALUE\n * (-2^63) because -MIN_VALUE == MIN_VALUE (since 2^63 cannot be represented as\n * a positive number, it overflows back into a negative). Not handling this\n * case would often result in infinite recursion.\n *\n * @param {number} low The low (signed) 32 bits of the long.\n * @param {number} high The high (signed) 32 bits of the long.\n * @constructor\n * @final\n */\nKotlin.Long = function(low, high) {\n /**\n   * @type {number}\n   * @private\n   */\n this.low_ = low | 0; // force into 32 signed bits.\n\n /**\n   * @type {number}\n   * @private\n   */\n this.high_ = high | 0; // force into 32 signed bits.\n};\n\nKotlin.Long.$metadata$ = {\n   kind: \"class\",\n   simpleName: \"Long\",\n   interfaces:[]\n};\n\n\n// NOTE: Common constant values ZERO, ONE, NEG_ONE, etc. are defined below the\n// from* methods on which they depend.\n\n\n/**\n * A cache of the Long representations of small integer values.\n * @type {!Object}\n * @private\n */\nKotlin.Long.IntCache_ = {};\n\n\n/**\n * Returns a Long representing the given (32-bit) integer value.\n * @param {number} value The 32-bit integer in question.\n * @return {!Kotlin.Long} The corresponding Long value.\n */\nKotlin.Long.fromInt = function(value) {\n if (-128 <= value && value < 128) {\n   var cachedObj = Kotlin.Long.IntCache_[value];\n   if (cachedObj) {\n   return cachedObj;\n   }\n }\n\n var obj = new Kotlin.Long(value | 0, value < 0 ? -1 : 0);\n if (-128 <= value && value < 128) {\n   Kotlin.Long.IntCache_[value] = obj;\n }\n return obj;\n};\n\n\n/**\n * Returns a Long representing the given value, provided that it is a finite\n * number. Otherwise, zero is returned.\n * @param {number} value The number in question.\n * @return {!Kotlin.Long} The corresponding Long value.\n */\nKotlin.Long.fromNumber = function(value) {\n if (isNaN(value) || !isFinite(value)) {\n   return Kotlin.Long.ZERO;\n } else if (value <= -Kotlin.Long.TWO_PWR_63_DBL_) {\n   return Kotlin.Long.MIN_VALUE;\n } else if (value + 1 >= Kotlin.Long.TWO_PWR_63_DBL_) {\n   return

Kotlin.Long.MAX_VALUE;\n } else if (value < 0) {\n   return Kotlin.Long.fromNumber(-value).negate();\n } else {\n   return new Kotlin.Long(\n   (value % Kotlin.Long.TWO_PWR_32_DBL_) | 0,\n   (value / Kotlin.Long.TWO_PWR_32_DBL_) | 0);\n }\n};\n\n\n/**\n * Returns a Long representing the 64-bit integer that comes by concatenating\n * the given high and low bits. Each is assumed to use 32 bits.\n * @param {number} lowBits The low 32-bits.\n * @param {number} highBits The high 32-bits.\n * @return {!Kotlin.Long} The corresponding Long value.\n */\nKotlin.Long.fromBits = function(lowBits, highBits) {\n return new Kotlin.Long(lowBits, highBits);\n};\n\n\n/**\n * Returns a Long representation of the given string, written using the given\n * radix.\n * @param {string} str The textual representation of the Long.\n * @param {number=} opt_radix The radix in which the text is written.\n * @return {!Kotlin.Long} The corresponding Long value.\n */\nKotlin.Long.fromString = function(str, opt_radix) {\n if (str.length == 0) {\n   throw Error('number format error: empty string');\n }\n\n var radix = opt_radix || 10;\n if (radix < 2 || 36 < radix) {\n   throw Error('radix out of range: ' + radix);\n }\n\n if (str.charAt(0) == '-') {\n   return Kotlin.Long.fromString(str.substring(1), radix).negate();\n } else if (str.indexOf('-') >= 0) {\n   throw Error('number format error: interior \"-\" character: ' + str);\n }\n\n // Do several (8) digits each time through the loop, so as to\n // minimize the calls to the very expensive emulated div.\n var radixToPower = Kotlin.Long.fromNumber(Math.pow(radix, 8));\n\n var result = Kotlin.Long.ZERO;\n for (var i = 0; i < str.length; i += 8) {\n   var size = Math.min(8, str.length - i);\n   var value = parseInt(str.substring(i, i + size), radix);\n   if (size < 8) {\n   var power = Kotlin.Long.fromNumber(Math.pow(radix, size));\n   result = result.multiply(power).add(Kotlin.Long.fromNumber(value));\n   } else {\n   result = result.multiply(radixToPower);\n   result = result.add(Kotlin.Long.fromNumber(value));\n   }\n }\n return result;\n};\n\n\n// NOTE: the compiler should inline these constant values below and then remove\n// these variables, so there should be no runtime penalty for these.\n\n\n/**\n * Number used repeated below in calculations. This must appear before the\n * first call to any from* function below.\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_16_DBL_ = 1 << 16;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_24_DBL_ = 1 << 24;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_32_DBL_ =\n   Kotlin.Long.TWO_PWR_16_DBL_ * Kotlin.Long.TWO_PWR_16_DBL_;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_31_DBL_ =\n   Kotlin.Long.TWO_PWR_32_DBL_ / 2;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_48_DBL_ =\n   Kotlin.Long.TWO_PWR_32_DBL_ * Kotlin.Long.TWO_PWR_16_DBL_;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_64_DBL_ =\n   Kotlin.Long.TWO_PWR_32_DBL_ * Kotlin.Long.TWO_PWR_32_DBL_;\n\n\n/**\n * @type {number}\n * @private\n */\nKotlin.Long.TWO_PWR_63_DBL_ =\n   Kotlin.Long.TWO_PWR_64_DBL_ / 2;\n\n\n/** @type {!Kotlin.Long} */\nKotlin.Long.ZERO = Kotlin.Long.fromInt(0);\n\n\n/** @type {!Kotlin.Long} */\nKotlin.Long.ONE = Kotlin.Long.fromInt(1);\n\n\n/** @type {!Kotlin.Long} */\nKotlin.Long.NEG_ONE = Kotlin.Long.fromInt(-1);\n\n\n/** @type {!Kotlin.Long} */\nKotlin.Long.MAX_VALUE =\n   Kotlin.Long.fromBits(0xFFFFFFFF | 0, 0x7FFFFFFF | 0);\n\n\n/** @type {!Kotlin.Long} */\nKotlin.Long.MIN_VALUE = Kotlin.Long.fromBits(0, 0x80000000 | 0);\n\n\n/**\n * @type {!Kotlin.Long}\n * @private\n */\nKotlin.Long.TWO_PWR_24_ = Kotlin.Long.fromInt(1 << 24);\n\n\n/** @return {number} The value, assuming it is a 32-bit integer. */\nKotlin.Long.prototype.toInt = function() {\n return this.low_;\n};\n\n\n/** @return {number} The closest floating-point representation to this value. */\nKotlin.Long.prototype.toNumber = function() {\n return this.high_ * Kotlin.Long.TWO_PWR_32_DBL_ +\n   this.getLowBitsUnsigned();\n};\n\n\n/** @return {number} The 32-bit hashCode of this value. */\nKotlin.Long.prototype.hashCode = function() {\n return this.high_ ^ this.low_;\n};\n\n\n/**\n * @param {number=} opt_radix The radix in which the text should be written.\n * @return {string} The textual representation of this value.\n * @override\n */\nKotlin.Long.prototype.toString = function(opt_radix) {\n var radix = opt_radix || 10;\n if (radix < 2 || 36 < radix) {\n   throw Error('radix out of range: ' + radix);\n }\n\n if (this.isZero()) {\n   return '0';\n }\n\n if (this.isNegative()) {\n   if (this.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   // We need to

change the Long value before it can be negated, so we remove\n   // the bottom-most digit in this base and then recurse to do the rest.\n   var radixLong = Kotlin.Long.fromNumber(radix);\n   var div = this.div(radixLong);\n   var rem = div.multiply(radixLong).subtract(this);\n   return div.toString(radix) + rem.toInt().toString(radix);\n   } else {\n   return '-' + this.negate().toString(radix);\n   }\n }\n\n // Do several (6) digits each time through the loop, so as to\n // minimize the calls to the very expensive emulated div.\n var radixToPower = Kotlin.Long.fromNumber(Math.pow(radix, 6));\n\n var rem = this;\n var result = '';\n while (true) {\n   var remDiv = rem.div(radixToPower);\n   var intval = rem.subtract(remDiv.multiply(radixToPower)).toInt();\n   var digits = intval.toString(radix);\n\n   rem = remDiv;\n   if (rem.isZero()) {\n   return digits + result;\n   } else {\n   while (digits.length < 6) {\n   digits = '0' + digits;\n   }\n   result = '' + digits + result;\n   }\n }\n};\n\n\n/** @return {number} The high 32-bits as a signed value. */\nKotlin.Long.prototype.getHighBits = function() {\n return this.high_;\n};\n\n\n/** @return {number} The low 32-bits as a signed value. */\nKotlin.Long.prototype.getLowBits = function() {\n return this.low_;\n};\n\n\n/** @return {number} The low 32-bits as an unsigned value. */\nKotlin.Long.prototype.getLowBitsUnsigned = function() {\n return (this.low_ >= 0) ?\n   this.low_ : Kotlin.Long.TWO_PWR_32_DBL_ + this.low_;\n};\n\n\n/**\n * @return {number} Returns the number of bits needed to represent the absolute\n *   value of this Long.\n */\nKotlin.Long.prototype.getNumBitsAbs = function() {\n if (this.isNegative()) {\n   if (this.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return 64;\n   } else {\n   return this.negate().getNumBitsAbs();\n   }\n } else {\n   var val = this.high_ != 0 ? this.high_ : this.low_;\n   for (var bit = 31; bit > 0; bit--) {\n   if ((val & (1 << bit)) != 0) {\n   break;\n   }\n   }\n   return this.high_ != 0 ? bit + 33 : bit + 1;\n }\n};\n\n\n/** @return {boolean} Whether this value is zero. */\nKotlin.Long.prototype.isZero = function() {\n return this.high_ == 0 && this.low_ == 0;\n};\n\n\n/** @return {boolean} Whether this value is negative. */\nKotlin.Long.prototype.isNegative = function() {\n return this.high_ < 0;\n};\n\n\n/** @return {boolean} Whether this value is odd. */\nKotlin.Long.prototype.isOdd = function() {\n return (this.low_ & 1) == 1;\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long equals the other.\n */\nKotlin.Long.prototype.equalsLong = function(other) {\n return (this.high_ == other.high_) && (this.low_ == other.low_);\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long does not equal the other.\n */\nKotlin.Long.prototype.notEqualsLong = function(other) {\n return (this.high_ != other.high_) || (this.low_ != other.low_);\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long is less than the other.\n */\nKotlin.Long.prototype.lessThan = function(other) {\n return this.compare(other) < 0;\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long is less than or equal to the other.\n */\nKotlin.Long.prototype.lessThanOrEqual = function(other) {\n return this.compare(other) <= 0;\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long is greater than the other.\n */\nKotlin.Long.prototype.greaterThan = function(other) {\n return this.compare(other) > 0;\n};\n\n\n/**\n * @param {Kotlin.Long} other Long to compare against.\n * @return {boolean} Whether this Long is greater than or equal to the other.\n */\nKotlin.Long.prototype.greaterThanOrEqual = function(other) {\n return this.compare(other) >= 0;\n};\n\n\n/**\n * Compares this Long with the given one.\n * @param {Kotlin.Long} other Long to compare against.\n * @return {number} 0 if they are the same, 1 if the this is greater, and -1\n *   if the given one is greater.\n */\nKotlin.Long.prototype.compare = function(other) {\n if (this.equalsLong(other)) {\n   return 0;\n }\n\n var thisNeg = this.isNegative();\n var otherNeg = other.isNegative();\n if (thisNeg && !otherNeg) {\n   return -1;\n }\n if (!thisNeg && otherNeg) {\n   return 1;\n }\n\n // at this point, the signs are the same, so subtraction will not overflow\n if (this.subtract(other).isNegative()) {\n   return -1;\n } else {\n   return 1;\n }\n};\n\n\n/** @return {!Kotlin.Long} The negation of this value. */\nKotlin.Long.prototype.negate = function() {\n if (this.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return Kotlin.Long.MIN_VALUE;\n } else {\n   return this.not().add(Kotlin.Long.ONE);\n }\n};\n\n\n/**\n * Returns the sum of this and the given Long.\n * @param {Kotlin.Long} other Long to add to this one.\n * @return {!Kotlin.Long} The sum of this and the given Long.\n */\nKotlin.Long.prototype.add = function(other) {\n // Divide each number into 4 chunks of 16 bits, and

then sum the chunks.\n\n var a48 = this.high_ >>> 16;\n var a32 = this.high_ & 0xFFFF;\n var a16 = this.low_ >>> 16;\n var a00 = this.low_ & 0xFFFF;\n\n var b48 = other.high_ >>> 16;\n var b32 = other.high_ & 0xFFFF;\n var b16 = other.low_ >>> 16;\n var b00 = other.low_ & 0xFFFF;\n\n var c48 = 0, c32 = 0, c16 = 0, c00 = 0;\n c00 += a00 + b00;\n c16 += c00 >>> 16;\n c00 &= 0xFFFF;\n c16 += a16 + b16;\n c32 += c16 >>> 16;\n c16 &= 0xFFFF;\n c32 += a32 + b32;\n c48 += c32 >>> 16;\n c32 &= 0xFFFF;\n c48 += a48 + b48;\n c48 &= 0xFFFF;\n return Kotlin.Long.fromBits((c16 << 16) | c00, (c48 << 16) | c32);\n};\n\n\n/**\n * Returns the difference of this and the given Long.\n * @param {Kotlin.Long} other Long to subtract from this.\n * @return {!Kotlin.Long} The difference of this and the given Long.\n */\nKotlin.Long.prototype.subtract = function(other) {\n return this.add(other.negate());\n};\n\n\n/**\n * Returns the product of this and the given long.\n * @param {Kotlin.Long} other Long to multiply with this.\n * @return {!Kotlin.Long} The product of this and the other.\n */\nKotlin.Long.prototype.multiply = function(other) {\n if (this.isZero()) {\n   return Kotlin.Long.ZERO;\n } else if (other.isZero()) {\n   return Kotlin.Long.ZERO;\n }\n\n if (this.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return other.isOdd() ? Kotlin.Long.MIN_VALUE : Kotlin.Long.ZERO;\n } else if (other.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return this.isOdd() ? Kotlin.Long.MIN_VALUE : Kotlin.Long.ZERO;\n }\n\n if (this.isNegative()) {\n   if (other.isNegative()) {\n   return this.negate().multiply(other.negate());\n   } else {\n   return this.negate().multiply(other).negate();\n   }\n } else if (other.isNegative()) {\n   return this.multiply(other.negate()).negate();\n }\n\n // If both longs are small, use float multiplication\n if (this.lessThan(Kotlin.Long.TWO_PWR_24_) &&\n   other.lessThan(Kotlin.Long.TWO_PWR_24_)) {\n   return Kotlin.Long.fromNumber(this.toNumber() * other.toNumber());\n }\n\n // Divide each long into 4 chunks of 16 bits, and then add up 4x4 products.\n // We can skip products that would overflow.\n\n var a48 = this.high_ >>> 16;\n var a32 = this.high_ & 0xFFFF;\n var a16 = this.low_ >>> 16;\n var a00 = this.low_ & 0xFFFF;\n\n var b48 = other.high_ >>> 16;\n var b32 = other.high_ & 0xFFFF;\n var b16 = other.low_ >>> 16;\n var b00 = other.low_ & 0xFFFF;\n\n var c48 = 0, c32 = 0, c16 = 0, c00 = 0;\n c00 += a00 * b00;\n c16 += c00 >>> 16;\n c00 &= 0xFFFF;\n c16 += a16 * b00;\n c32 += c16 >>> 16;\n c16 &= 0xFFFF;\n c16 += a00 * b16;\n c32 += c16 >>> 16;\n c16 &= 0xFFFF;\n c32 += a32 * b00;\n c48 += c32 >>> 16;\n c32 &= 0xFFFF;\n c32 += a16 * b16;\n c48 += c32 >>> 16;\n c32 &= 0xFFFF;\n c32 += a00 * b32;\n c48 += c32 >>> 16;\n c32 &= 0xFFFF;\n c48 += a48 * b00 + a32 * b16 + a16 * b32 + a00 * b48;\n c48 &= 0xFFFF;\n return Kotlin.Long.fromBits((c16 << 16) | c00, (c48 << 16) | c32);\n};\n\n\n/**\n * Returns this Long divided by the given one.\n * @param {Kotlin.Long} other Long by which to divide.\n * @return {!Kotlin.Long} This Long divided by the given one.\n */\nKotlin.Long.prototype.div = function(other) {\n if (other.isZero()) {\n   throw Error('division by zero');\n } else if (this.isZero()) {\n   return Kotlin.Long.ZERO;\n }\n\n if (this.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   if (other.equalsLong(Kotlin.Long.ONE) ||\n   other.equalsLong(Kotlin.Long.NEG_ONE)) {\n   return Kotlin.Long.MIN_VALUE; // recall that -MIN_VALUE == MIN_VALUE\n   } else if (other.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return Kotlin.Long.ONE;\n   } else {\n   // At this point, we have |other| >= 2, so |this/other| < |MIN_VALUE|.\n   var halfThis = this.shiftRight(1);\n   var approx = halfThis.div(other).shiftLeft(1);\n   if (approx.equalsLong(Kotlin.Long.ZERO)) {\n   return other.isNegative() ? Kotlin.Long.ONE : Kotlin.Long.NEG_ONE;\n   } else {\n   var rem = this.subtract(other.multiply(approx));\n   var result = approx.add(rem.div(other));\n   return result;\n   }\n   }\n } else if (other.equalsLong(Kotlin.Long.MIN_VALUE)) {\n   return Kotlin.Long.ZERO;\n }\n\n if (this.isNegative()) {\n   if (other.isNegative()) {\n   return this.negate().div(other.negate());\n   } else {\n   return this.negate().div(other).negate();\n   }\n } else if (other.isNegative()) {\n   return this.div(other.negate()).negate();\n }\n\n // Repeat the following until the remainder is less than other: find a\n // floating-point that approximates remainder / other *from below*, add this\n // into the result, and subtract it from the remainder. It is critical that\n // the approximate value is less than or equal to the real value so that the\n // remainder never becomes negative.\n var res = Kotlin.Long.ZERO;\n var rem = this;\n while (rem.greaterThanOrEqual(other)) {\n   // Approximate the result of division. This may be a little greater or\n   // smaller than the actual value.\n   var approx = Math.max(1, Math.floor(rem.toNumber() / other.toNumber()));\n\n

// We will tweak the approximate result by changing it in the 48-th digit or\n   // the smallest non-fractional digit, whichever is larger.\n   var log2 = Math.ceil(Math.log(approx) / Math.LN2);\n   var delta = (log2 <= 48) ? 1 : Math.pow(2, log2 - 48);\n\n   // Decrease the approximation until it is smaller than the remainder. Note\n   // that if it is too large, the product overflows and is negative.\n   var approxRes = Kotlin.Long.fromNumber(approx);\n   var approxRem = approxRes.multiply(other);\n   while (approxRem.isNegative() || approxRem.greaterThan(rem)) {\n   approx -= delta;\n   approxRes = Kotlin.Long.fromNumber(approx);\n   approxRem = approxRes.multiply(other);\n   }\n\n   // We know the answer can't be zero... and actually, zero would cause\n   // infinite recursion since we would make no progress.\n   if (approxRes.isZero()) {\n   approxRes = Kotlin.Long.ONE;\n   }\n\n   res = res.add(approxRes);\n   rem = rem.subtract(approxRem);\n }\n return res;\n};\n\n\n/**\n * Returns this Long modulo the given one.\n * @param {Kotlin.Long} other Long by which to mod.\n * @return {!Kotlin.Long} This Long modulo the given one.\n */\nKotlin.Long.prototype.modulo = function(other) {\n return this.subtract(this.div(other).multiply(other));\n};\n\n\n/** @return {!Kotlin.Long} The bitwise-NOT of this value. */\nKotlin.Long.prototype.not = function() {\n return Kotlin.Long.fromBits(~this.low_, ~this.high_);\n};\n\n\n/**\n * Returns the bitwise-AND of this Long and the given one.\n * @param {Kotlin.Long} other The Long with which to AND.\n * @return {!Kotlin.Long} The bitwise-AND of this and the other.\n */\nKotlin.Long.prototype.and = function(other) {\n return Kotlin.Long.fromBits(this.low_ & other.low_,\n   this.high_ & other.high_);\n};\n\n\n/**\n * Returns the bitwise-OR of this Long and the given one.\n * @param {Kotlin.Long} other The Long with which to OR.\n * @return {!Kotlin.Long} The bitwise-OR of this and the other.\n */\nKotlin.Long.prototype.or = function(other) {\n return Kotlin.Long.fromBits(this.low_ | other.low_,\n   this.high_ | other.high_);\n};\n\n\n/**\n * Returns the bitwise-XOR of this Long and the given one.\n * @param {Kotlin.Long} other The Long with which to XOR.\n * @return {!Kotlin.Long} The bitwise-XOR of this and the other.\n */\nKotlin.Long.prototype.xor = function(other) {\n return Kotlin.Long.fromBits(this.low_ ^ other.low_,\n   this.high_ ^ other.high_);\n};\n\n\n/**\n * Returns this Long with bits shifted to the left by the given amount.\n * @param {number} numBits The number of bits by which to shift.\n * @return {!Kotlin.Long} This shifted to the left by the given amount.\n */\nKotlin.Long.prototype.shiftLeft = function(numBits) {\n numBits &= 63;\n if (numBits == 0) {\n   return this;\n } else {\n   var low = this.low_;\n   if (numBits < 32) {\n   var high = this.high_;\n   return Kotlin.Long.fromBits(\n   low << numBits,\n   (high << numBits) | (low >>> (32 - numBits)));\n   } else {\n   return Kotlin.Long.fromBits(0, low << (numBits - 32));\n   }\n }\n};\n\n\n/**\n * Returns this Long with bits shifted to the right by the given amount.\n * @param {number} numBits The number of bits by which to shift.\n * @return {!Kotlin.Long} This shifted to the right by the given amount.\n */\nKotlin.Long.prototype.shiftRight = function(numBits) {\n numBits &= 63;\n if (numBits == 0) {\n   return this;\n } else {\n   var high = this.high_;\n   if (numBits < 32) {\n   var low = this.low_;\n   return Kotlin.Long.fromBits(\n   (low >>> numBits) | (high << (32 - numBits)),\n   high >> numBits);\n   } else {\n   return Kotlin.Long.fromBits(\n   high >> (numBits - 32),\n   high >= 0 ? 0 : -1);\n   }\n }\n};\n\n\n/**\n * Returns this Long with bits shifted to the right by the given amount, with\n * zeros placed into the new leading bits.\n * @param {number} numBits The number of bits by which to shift.\n * @return {!Kotlin.Long} This shifted to the right by the given amount, with\n *   zeros placed into the new leading bits.\n */\nKotlin.Long.prototype.shiftRightUnsigned = function(numBits) {\n numBits &= 63;\n if (numBits == 0) {\n   return this;\n } else {\n   var high = this.high_;\n   if (numBits < 32) {\n   var low = this.low_;\n   return Kotlin.Long.fromBits(\n   (low >>> numBits) | (high << (32 - numBits)),\n   high >>> numBits);\n   } else if (numBits == 32) {\n   return Kotlin.Long.fromBits(high, 0);\n   } else {\n   return Kotlin.Long.fromBits(high >>> (numBits - 32), 0);\n   }\n }\n};\n\n// Support for Kotlin\nKotlin.Long.prototype.equals = function (other) {\n   return other instanceof Kotlin.Long && this.equalsLong(other);\n};\n\nKotlin.Long.prototype.compareTo_11rb$ = Kotlin.Long.prototype.compare;\n\nKotlin.Long.prototype.inc = function() {\n   return this.add(Kotlin.Long.ONE);\n};\n\nKotlin.Long.prototype.dec = function() {\n   return this.add(Kotlin.Long.NEG_ONE);\n};\n\nKotlin.Long.prototype.valueOf = function() {\n   return this.toNumber();\n};\n\nKotlin.Long.prototype.unaryPlus = function() {\n   return

this;\n};\n\nKotlin.Long.prototype.unaryMinus = Kotlin.Long.prototype.negate;\nKotlin.Long.prototype.inv = Kotlin.Long.prototype.not;\nKotlin.Long.prototype.rangeTo = function (other) {\n   return new Kotlin.kotlin.ranges.LongRange(this, other);\n};","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\nKotlin.Kind = {\n   CLASS: \"class\",\n   INTERFACE: \"interface\",\n   OBJECT: \"object\"\n};\n\nKotlin.callGetter = function (thisObject, klass, propertyName) {\n   var propertyDescriptor = Object.getOwnPropertyDescriptor(klass, propertyName);\n   if (propertyDescriptor != null && propertyDescriptor.get != null) {\n   return propertyDescriptor.get.call(thisObject);\n   }\n\n   propertyDescriptor = Object.getOwnPropertyDescriptor(thisObject, propertyName);\n   if (propertyDescriptor != null && \"value\" in propertyDescriptor) {\n   return thisObject[propertyName];\n   }\n\n   return Kotlin.callGetter(thisObject, Object.getPrototypeOf(klass), propertyName);\n};\n\nKotlin.callSetter = function (thisObject, klass, propertyName, value) {\n   var propertyDescriptor = Object.getOwnPropertyDescriptor(klass, propertyName);\n   if (propertyDescriptor != null && propertyDescriptor.set != null) {\n   propertyDescriptor.set.call(thisObject, value);\n   return;\n   }\n\n   propertyDescriptor = Object.getOwnPropertyDescriptor(thisObject, propertyName);\n   if (propertyDescriptor != null && \"value\" in propertyDescriptor) {\n   thisObject[propertyName] = value;\n   return\n   }\n\n   Kotlin.callSetter(thisObject, Object.getPrototypeOf(klass), propertyName, value);\n};\n\nfunction isInheritanceFromInterface(ctor, iface) {\n   if (ctor === iface) return true;\n\n   var metadata = ctor.$metadata$;\n   if (metadata != null) {\n   var interfaces = metadata.interfaces;\n   for (var i = 0; i < interfaces.length; i++) {\n   if (isInheritanceFromInterface(interfaces[i], iface)) {\n   return true;\n   }\n   }\n   }\n\n   var superPrototype = ctor.prototype != null ? Object.getPrototypeOf(ctor.prototype) : null;\n   var superConstructor = superPrototype != null ? superPrototype.constructor : null;\n   return superConstructor != null && isInheritanceFromInterface(superConstructor, iface);\n}\n\n/**\n *\n * @param {*} object\n * @param {Function|Object} klass\n * @returns {Boolean}\n */\nKotlin.isType = function (object, klass) {\n   if (klass === Object) {\n   switch (typeof object) {\n   case \"string\":\n   case \"number\":\n   case \"boolean\":\n   case \"function\":\n   return true;\n   default:\n   return object instanceof Object;\n   }\n   }\n\n   if (object == null || klass == null || (typeof object !== 'object' && typeof object !== 'function')) {\n   return false;\n   }\n\n   if (typeof klass === \"function\" && object instanceof klass) {\n   return true;\n   }\n\n   var proto = Object.getPrototypeOf(klass);\n   var constructor = proto != null ? proto.constructor : null;\n   if (constructor != null && \"$metadata$\" in constructor) {\n   var metadata = constructor.$metadata$;\n   if (metadata.kind === Kotlin.Kind.OBJECT) {\n   return object === klass;\n   }\n   }\n\n   var klassMetadata = klass.$metadata$;\n\n   // In WebKit (JavaScriptCore) for some interfaces from DOM typeof returns \"object\", nevertheless they can be used in RHS of instanceof\n   if (klassMetadata == null) {\n   return object instanceof klass;\n   }\n\n   if (klassMetadata.kind === Kotlin.Kind.INTERFACE && object.constructor != null) {\n   return isInheritanceFromInterface(object.constructor, klass);\n   }\n\n   return false;\n};\n\nKotlin.isNumber = function (a) {\n   return typeof a == \"number\" || a instanceof Kotlin.Long;\n};\n\nKotlin.isChar = function (value) {\n   return value instanceof Kotlin.BoxedChar\n};\n\nKotlin.isComparable = function (value) {\n   var type = typeof value;\n\n   return type === \"string\" ||\n   type === \"boolean\" ||\n   Kotlin.isNumber(value) ||\n   Kotlin.isType(value, Kotlin.kotlin.Comparable);\n};\n\nKotlin.isCharSequence = function (value) {\n   return typeof value === \"string\" || Kotlin.isType(value, Kotlin.kotlin.CharSequence);\n};","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing,

software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n/**\n * @param {string} id\n * @param {Object} declaration */\nKotlin.defineModule = function (id, declaration) {\n};\n\nKotlin.defineInlineFunction = function(tag, fun) {\n   return fun;\n};\n\nKotlin.wrapFunction = function(fun) {\n   var f = function() {\n   f = fun();\n   return f.apply(this, arguments);\n   };\n   return function() {\n   return f.apply(this, arguments);\n   };\n};\n\nKotlin.isTypeOf = function(type) {\n   return function (object) {\n   return typeof object === type;\n   }\n};\n\nKotlin.isInstanceOf = function (klass) {\n   return function (object) {\n   return Kotlin.isType(object, klass);\n   }\n};\n\nKotlin.orNull = function (fn) {\n   return function (object) {\n   return object == null || fn(object);\n   }\n};\n\nKotlin.andPredicate = function (a, b) {\n   return function (object) {\n   return a(object) && b(object);\n   }\n};\n\nKotlin.kotlinModuleMetadata = function (abiVersion, moduleName, data) {\n};\n\nKotlin.suspendCall = function(value) {\n   return value;\n};\n\nKotlin.coroutineResult = function(qualifier) {\n   throwMarkerError();\n};\n\nKotlin.coroutineController = function(qualifier) {\n   throwMarkerError();\n};\n\nKotlin.coroutineReceiver = function(qualifier) {\n   throwMarkerError();\n};\n\nKotlin.setCoroutineResult = function(value, qualifier) {\n   throwMarkerError();\n};\n\nfunction throwMarkerError() {\n   throw new Error(\n   \"This marker function should never been called. \" +\n   \"Looks like compiler did not eliminate it properly. \" +\n   \"Please, report an issue if you caught this exception.\");\n}\n\nKotlin.getFunctionById = function(id, defaultValue) {\n   return function() {\n   return defaultValue;\n   }\n};","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// a package is omitted to get declarations directly under the module\n\n@PublishedApi\nexternal internal fun <T> Array(size: Int): Array<T>\n\n@JsName(\"newArray\")\nfun <T> newArray(size: Int, initValue: T) = fillArrayVal(Array<T>(size), initValue)\n\n@JsName(\"newArrayF\")\ninline fun <T> arrayWithFun(size: Int, init: (Int) -> T) = fillArrayFun(Array<T>(size), init)\n\n@JsName(\"fillArray\")\ninline fun <T> fillArrayFun(array: Array<T>, init: (Int) -> T): Array<T> {\n   for (i in 0..array.size - 1) {\n   array[i] = init(i)\n   }\n   return array\n}\n\n@JsName(\"booleanArray\")\nfun booleanArray(size: Int, init: dynamic): Array<Boolean> {\n   val result: dynamic = Array<Boolean>(size)\n   result.`$type$` = \"BooleanArray\"\n   return when (init) {\n   null, true -> fillArrayVal(result, false)\n   false -> result\n   else -> fillArrayFun<Boolean>(result, init)\n   }\n}\n\n@JsName(\"booleanArrayF\")\ninline fun booleanArrayWithFun(size: Int, init: (Int) -> Boolean): Array<Boolean> = fillArrayFun(booleanArray(size, false), init)\n\n@JsName(\"charArray\")\n@Suppress(\"UNUSED_PARAMETER\")\nfun charArray(size: Int, init: dynamic): Array<Char> {\n   val result = js(\"new Uint16Array(size)\")\n   result.`$type$` = \"CharArray\"\n   return when (init) {\n   null, true, false -> result // For consistency\n   else -> fillArrayFun<Char>(result, init)\n   }\n}\n\n@JsName(\"charArrayF\")\ninline fun charArrayWithFun(size: Int, init: (Int) -> Char): Array<Char> {\n   val array = charArray(size, null)\n   for (i in 0..array.size - 1) {\n   val value = init(i)\n   js(\"array[i] = value;\")\n   }\n   return array\n}\n\n@JsName(\"untypedCharArrayF\")\ninline fun untypedCharArrayWithFun(size: Int, init: (Int) -> Char): Array<Char> {\n   val array = Array<Char>(size)\n   for (i in 0..array.size - 1) {\n   val value = init(i)\n   js(\"array[i] = value;\")\n   }\n   return array\n}\n\n@JsName(\"longArray\")\nfun longArray(size: Int, init: dynamic): Array<Long> {\n   val result: dynamic = Array<Long>(size)\n   result.`$type$` = \"LongArray\"\n   return when (init) {\n   null, true -> fillArrayVal(result, 0L)\n   false -> result\n   else -> fillArrayFun<Long>(result, init)\n   }\n}\n\n@JsName(\"longArrayF\")\ninline fun longArrayWithFun(size: Int, init: (Int) -> Long): Array<Long> = fillArrayFun(longArray(size, false), init)\n\nprivate fun <T> fillArrayVal(array: Array<T>, initValue: T): Array<T> {\n   for (i in 0..array.size - 1) {\n   array[i] = initValue\n   }\n   return array\n}","/*\n * Copyright 2010-2016

JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin\n\npublic class Enum<T : Enum<T>> : Comparable<Enum<T>> {\n   @JsName(\"name$\") private var _name: String = \"\"\n   @JsName(\"ordinal$\") private var _ordinal: Int = 0\n\n   val name: String\n   get() = _name\n\n   val ordinal: Int\n   get() = _ordinal\n\n   override fun compareTo(other: Enum<T>) = ordinal.compareTo(other.ordinal)\n\n   override fun equals(other: Any?) = this === other\n\n   override fun hashCode(): Int = js(\"Kotlin.identityHashCode\")(this)\n\n   override fun toString() = name\n\n   companion object\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.js.internal\n\n@JsName(\"DoubleCompanionObject\")\nprivate object DoubleCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Double = js(\"Number.MIN_VALUE\")\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Double = js(\"Number.MAX_VALUE\")\n\n   @JsName(\"POSITIVE_INFINITY\")\n   val POSITIVE_INFINITY: Double = js(\"Number.POSITIVE_INFINITY\")\n\n   @JsName(\"NEGATIVE_INFINITY\")\n   val NEGATIVE_INFINITY: Double = js(\"Number.NEGATIVE_INFINITY\")\n\n   @JsName(\"NaN\")\n   val NaN: Double = js(\"Number.NaN\")\n}\n\n@JsName(\"FloatCompanionObject\")\nprivate object FloatCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Float = js(\"Number.MIN_VALUE\")\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Float = js(\"Number.MAX_VALUE\")\n\n   @JsName(\"POSITIVE_INFINITY\")\n   val POSITIVE_INFINITY: Float = js(\"Number.POSITIVE_INFINITY\")\n\n   @JsName(\"NEGATIVE_INFINITY\")\n   val NEGATIVE_INFINITY: Float = js(\"Number.NEGATIVE_INFINITY\")\n\n   @JsName(\"NaN\")\n   val NaN: Float = js(\"Number.NaN\")\n}\n\n@JsName(\"IntCompanionObject\")\nprivate object IntCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Int = -2147483647 - 1\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Int = 2147483647\n}\n\n@JsName(\"LongCompanionObject\")\nprivate object LongCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Long = js(\"Kotlin.Long.MIN_VALUE\")\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Long = js(\"Kotlin.Long.MAX_VALUE\")\n}\n\n@JsName(\"ShortCompanionObject\")\nprivate object ShortCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Short = -32768\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Short = 32767\n}\n\n@JsName(\"ByteCompanionObject\")\nprivate object ByteCompanionObject {\n   @JsName(\"MIN_VALUE\")\n   val MIN_VALUE: Byte = -128\n\n   @JsName(\"MAX_VALUE\")\n   val MAX_VALUE: Byte = 127\n}\n\n@JsName(\"CharCompanionObject\")\nprivate object CharCompanionObject {\n   @JsName(\"MIN_HIGH_SURROGATE\")\n   public const val MIN_HIGH_SURROGATE: Char = \\uD800'\n\n   @JsName(\"MAX_HIGH_SURROGATE\")\n   public const val MAX_HIGH_SURROGATE: Char = \\uDBFF'\n\n   @JsName(\"MIN_LOW_SURROGATE\")\n   public const val MIN_LOW_SURROGATE: Char = \\uDC00'\n\n   @JsName(\"MAX_LOW_SURROGATE\")\n   public const val MAX_LOW_SURROGATE: Char = \\uDFFF'\n\n   @JsName(\"MIN_SURROGATE\")\n   public const val MIN_SURROGATE: Char = MIN_HIGH_SURROGATE\n\n   @JsName(\"MAX_SURROGATE\")\n   public const val MAX_SURROGATE: Char = MAX_LOW_SURROGATE\n}\n\nprivate object StringCompanionObject {}\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"ArraysKt\")\n\npackage

kotlin.collections\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport primitiveArrayConcat\nimport withType\nimport kotlin.comparisons.*\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Array<out T>.component1(): T {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ByteArray.component1(): Byte {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ShortArray.component1(): Short {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun IntArray.component1(): Int {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun LongArray.component1(): Long {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun FloatArray.component1(): Float {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun DoubleArray.component1(): Double {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun BooleanArray.component1(): Boolean {\n   return get(0)\n}\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun CharArray.component1(): Char {\n   return get(0)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Array<out T>.component2(): T {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ByteArray.component2(): Byte {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ShortArray.component2(): Short {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun IntArray.component2(): Int {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun LongArray.component2(): Long {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun FloatArray.component2(): Float {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun DoubleArray.component2(): Double {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun BooleanArray.component2(): Boolean {\n   return get(1)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun CharArray.component2(): Char {\n   return get(1)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Array<out T>.component3(): T {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ByteArray.component3(): Byte {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ShortArray.component3(): Short {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun IntArray.component3(): Int {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun LongArray.component3(): Long {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun FloatArray.component3(): Float {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun DoubleArray.component3(): Double {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun BooleanArray.component3(): Boolean {\n   return get(2)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun CharArray.component3(): Char {\n   return get(2)\n}\n\n/**\n * Returns 4th *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Array<out T>.component4(): T {\n   return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun ByteArray.component4(): Byte {\n   return get(3)\n}\n\n/**\n * Returns 4th *element* from the

collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun ShortArray.component4(): Short {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun IntArray.component4(): Int {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun LongArray.component4(): Long {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun FloatArray.component4(): Float {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun DoubleArray.component4(): Double {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun BooleanArray.component4(): Boolean {\n return get(3)\n}\n\n/**\n * Returns 4th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun CharArray.component4(): Char {\n return get(3)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Array<out T>.component5(): T {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun ByteArray.component5(): Byte {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun ShortArray.component5(): Short {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun IntArray.component5(): Int {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun LongArray.component5(): Long {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun FloatArray.component5(): Float {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun DoubleArray.component5(): Double {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun BooleanArray.component5(): Boolean {\n return get(4)\n}\n\n/**\n * Returns 5th *element* from the collection.\n *\n@kotlin.internal.InlineOnly\npublic inline operator fun CharArray.component5(): Char {\n return get(4)\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun <@kotlin.internal.OnlyInputTypes T> Array<out T>.contains(element: T): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun ByteArray.contains(element: Byte): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun ShortArray.contains(element: Short): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun IntArray.contains(element: Int): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun LongArray.contains(element: Long): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun FloatArray.contains(element: Float): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun DoubleArray.contains(element: Double): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun BooleanArray.contains(element: Boolean): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns `true` if [element] is found in the array.\n *\npublic operator fun CharArray.contains(element: Char): Boolean {\n return indexOf(element) >= 0\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.elementAt(index: Int): T {\n return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.elementAt(index: Int): Byte {\n return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.elementAt(index: Int): Short {\n return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun

IntArray.elementAt(index: Int): Int {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.elementAt(index: Int): Long {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.elementAt(index: Int): Float {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.elementAt(index: Int): Double {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.elementAt(index: Int): Boolean {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.elementAt(index: Int): Char {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.elementAtOrElse(index: Int, defaultValue: (Int) -> T): T {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Byte): Byte {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Short): Short {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Int): Int {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Long): Long {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Float): Float {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Double): Double {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Boolean): Boolean {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.elementAtOrElse(index: Int, defaultValue: (Int) -> Char): Char {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.elementAtOrNull(index: Int): T? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.elementAtOrNull(index: Int): Byte? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out

of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.elementAtOrNull(index: Int): Short? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.elementAtOrNull(index: Int): Int? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.elementAtOrNull(index: Int): Long? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.elementAtOrNull(index: Int): Float? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.elementAtOrNull(index: Int): Double? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.elementAtOrNull(index: Int): Boolean? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.elementAtOrNull(index: Int): Char? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.find(predicate: (T) -> Boolean): T? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.find(predicate: (Byte) -> Boolean): Byte? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.find(predicate: (Short) -> Boolean): Short? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.find(predicate: (Int) -> Boolean): Int? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.find(predicate: (Long) -> Boolean): Long? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.find(predicate: (Float) -> Boolean): Float? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.find(predicate: (Double) -> Boolean): Double? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.find(predicate: (Boolean) -> Boolean): Boolean? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.find(predicate: (Char) -> Boolean): Char? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.findLast(predicate: (T) -> Boolean): T? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.findLast(predicate: (Byte) -> Boolean): Byte? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.findLast(predicate: (Short) -> Boolean): Short? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.findLast(predicate: (Int) -> Boolean): Int? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.findLast(predicate: (Long) -> Boolean): Long? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns

the last element matching the given [predicate], or `null` if no such element was found.\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.findLast(predicate: (Float) -> Boolean): Float? {\n
return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no
such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.findLast(predicate:
(Double) -> Boolean): Double? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching
the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun
BooleanArray.findLast(predicate: (Boolean) -> Boolean): Boolean? {\n   return lastOrNull(predicate)\n}\n\n/**\n *
Returns the last element matching the given [predicate], or `null` if no such element was found.\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.findLast(predicate: (Char) -> Boolean): Char? {\n
return lastOrNull(predicate)\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the
array is empty.\n */\npublic fun <T> Array<out T>.first(): T {\n   if (isEmpty())\n   throw
NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns first element.\n * @throws
[NoSuchElementException] if the array is empty.\n */\npublic fun ByteArray.first(): Byte {\n   if (isEmpty())\n
throw NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns first element.\n *
@throws [NoSuchElementException] if the array is empty.\n */\npublic fun ShortArray.first(): Short {\n   if
(isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns first
element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun IntArray.first(): Int {\n   if
(isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns first
element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun LongArray.first(): Long
{\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n *
Returns first element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun
FloatArray.first(): Float {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return
this[0]\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the array is empty.\n
*/\npublic fun DoubleArray.first(): Double {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is
empty.\")\n   return this[0]\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the
array is empty.\n */\npublic fun BooleanArray.first(): Boolean {\n   if (isEmpty())\n   throw
NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns first element.\n * @throws
[NoSuchElementException] if the array is empty.\n */\npublic fun CharArray.first(): Char {\n   if (isEmpty())\n
throw NoSuchElementException(\"Array is empty.\")\n   return this[0]\n}\n\n/**\n * Returns the first element
matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic
inline fun <T> Array<out T>.first(predicate: (T) -> Boolean): T {\n   for (element in this) if (predicate(element))
return element\n   throw NoSuchElementException(\"Array contains no element matching the
predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws
[NoSuchElementException] if no such element is found.\n */\npublic inline fun ByteArray.first(predicate: (Byte) ->
Boolean): Byte {\n   for (element in this) if (predicate(element)) return element\n   throw
NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first
element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n
*/\npublic inline fun ShortArray.first(predicate: (Short) -> Boolean): Short {\n   for (element in this) if
(predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the
predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws
[NoSuchElementException] if no such element is found.\n */\npublic inline fun IntArray.first(predicate: (Int) ->
Boolean): Int {\n   for (element in this) if (predicate(element)) return element\n   throw
NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first
element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n
*/\npublic inline fun LongArray.first(predicate: (Long) -> Boolean): Long {\n   for (element in this) if
(predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the
predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws
[NoSuchElementException] if no such element is found.\n */\npublic inline fun FloatArray.first(predicate: (Float) ->

Boolean): Float {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n *\npublic inline fun DoubleArray.first(predicate: (Double) -> Boolean): Double {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n *\npublic inline fun BooleanArray.first(predicate: (Boolean) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n *\npublic inline fun CharArray.first(predicate: (Char) -> Boolean): Char {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun <T> Array<out T>.firstOrNull(): T? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun ByteArray.firstOrNull(): Byte? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun ShortArray.firstOrNull(): Short? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun IntArray.firstOrNull(): Int? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun LongArray.firstOrNull(): Long? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun FloatArray.firstOrNull(): Float? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun DoubleArray.firstOrNull(): Double? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun BooleanArray.firstOrNull(): Boolean? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element, or `null` if the array is empty.\n *\npublic fun CharArray.firstOrNull(): Char? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun <T> Array<out T>.firstOrNull(predicate: (T) -> Boolean): T? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun ByteArray.firstOrNull(predicate: (Byte) -> Boolean): Byte? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun ShortArray.firstOrNull(predicate: (Short) -> Boolean): Short? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun IntArray.firstOrNull(predicate: (Int) -> Boolean): Int? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun LongArray.firstOrNull(predicate: (Long) -> Boolean): Long? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun FloatArray.firstOrNull(predicate: (Float) -> Boolean): Float? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun DoubleArray.firstOrNull(predicate: (Double) -> Boolean): Double? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun BooleanArray.firstOrNull(predicate: (Boolean) -> Boolean): Boolean? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\npublic inline fun CharArray.firstOrNull(predicate: (Char) -> Boolean): Char? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n *

Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.getOrElse(index: Int, defaultValue: (Int) -> T): T {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.getOrElse(index: Int, defaultValue: (Int) -> Byte): Byte {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.getOrElse(index: Int, defaultValue: (Int) -> Short): Short {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.getOrElse(index: Int, defaultValue: (Int) -> Int): Int {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.getOrElse(index: Int, defaultValue: (Int) -> Long): Long {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.getOrElse(index: Int, defaultValue: (Int) -> Float): Float {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.getOrElse(index: Int, defaultValue: (Int) -> Double): Double {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.getOrElse(index: Int, defaultValue: (Int) -> Boolean): Boolean {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.getOrElse(index: Int, defaultValue: (Int) -> Char): Char {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun <T> Array<out T>.getOrNull(index: Int): T? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun ByteArray.getOrNull(index: Int): Byte? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun ShortArray.getOrNull(index: Int): Short? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun IntArray.getOrNull(index: Int): Int? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun LongArray.getOrNull(index: Int): Long? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun FloatArray.getOrNull(index: Int): Float? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun DoubleArray.getOrNull(index: Int): Double? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun BooleanArray.getOrNull(index: Int): Boolean? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this array.\n */\npublic fun CharArray.getOrNull(index: Int): Char? {\n   return if (index >= 0 && index

<= lastIndex) get(index) else null\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Array<out T>.indexOf(element: T): Int {\n   if (element == null) {\n   for (index in indices) {\n   if (this[index] == null) {\n   return index\n   }\n   }\n   } else {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun ByteArray.indexOf(element: Byte): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun ShortArray.indexOf(element: Short): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun IntArray.indexOf(element: Int): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun LongArray.indexOf(element: Long): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun FloatArray.indexOf(element: Float): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun DoubleArray.indexOf(element: Double): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun BooleanArray.indexOf(element: Boolean): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the array does not contain element.\n */\npublic fun CharArray.indexOf(element: Char): Int {\n   for (index in indices) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun <T> Array<out T>.indexOfFirst(predicate: (T) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun ByteArray.indexOfFirst(predicate: (Byte) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun ShortArray.indexOfFirst(predicate: (Short) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun IntArray.indexOfFirst(predicate: (Int) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index]))\n   {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun LongArray.indexOfFirst(predicate: (Long) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun FloatArray.indexOfFirst(predicate: (Float) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun DoubleArray.indexOfFirst(predicate: (Double) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun BooleanArray.indexOfFirst(predicate: (Boolean) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun

CharArray.indexOfFirst(predicate: (Char) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun <T> Array<out T>.indexOfLast(predicate: (T) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun ByteArray.indexOfLast(predicate: (Byte) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun ShortArray.indexOfLast(predicate: (Short) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun IntArray.indexOfLast(predicate: (Int) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun LongArray.indexOfLast(predicate: (Long) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun FloatArray.indexOfLast(predicate: (Float) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun DoubleArray.indexOfLast(predicate: (Double) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun BooleanArray.indexOfLast(predicate: (Boolean) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the array does not contain such element.\n */\npublic inline fun CharArray.indexOfLast(predicate: (Char) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun <T> Array<out T>.last(): T {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun ByteArray.last(): Byte {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun ShortArray.last(): Short {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun IntArray.last(): Int {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun LongArray.last(): Long {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun FloatArray.last(): Float {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun DoubleArray.last(): Double {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun BooleanArray.last(): Boolean {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the array is empty.\n */\npublic fun

CharArray.last(): Char {\n   if (isEmpty())\n   throw NoSuchElementException(\"Array is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun <T> Array<out T>.last(predicate: (T) -> Boolean): T {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun ByteArray.last(predicate: (Byte) -> Boolean): Byte {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun ShortArray.last(predicate: (Short) -> Boolean): Short {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun IntArray.last(predicate: (Int) -> Boolean): Int {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun LongArray.last(predicate: (Long) -> Boolean): Long {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun FloatArray.last(predicate: (Float) -> Boolean): Float {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun DoubleArray.last(predicate: (Double) -> Boolean): Double {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun BooleanArray.last(predicate: (Boolean) -> Boolean): Boolean {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun CharArray.last(predicate: (Char) -> Boolean): Char {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Array<out T>.lastIndexOf(element: T): Int {\n   if (element == null) {\n   for (index in indices.reversed()) {\n   if (this[index] == null) {\n   return index\n   }\n   }\n   } else {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun ByteArray.lastIndexOf(element: Byte): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun ShortArray.lastIndexOf(element: Short): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun IntArray.lastIndexOf(element: Int): Int {\n   for (index in

indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun LongArray.lastIndexOf(element: Long): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun FloatArray.lastIndexOf(element: Float): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun DoubleArray.lastIndexOf(element: Double): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun BooleanArray.lastIndexOf(element: Boolean): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns last index of [element], or -1 if the array does not contain element.\n */\npublic fun CharArray.lastIndexOf(element: Char): Int {\n   for (index in indices.reversed()) {\n   if (element == this[index]) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun <T> Array<out T>.lastOrNull(): T? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun ByteArray.lastOrNull(): Byte? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun ShortArray.lastOrNull(): Short? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun IntArray.lastOrNull(): Int? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun LongArray.lastOrNull(): Long? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun FloatArray.lastOrNull(): Float? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun DoubleArray.lastOrNull(): Double? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun BooleanArray.lastOrNull(): Boolean? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element, or `null` if the array is empty.\n */\npublic fun CharArray.lastOrNull(): Char? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun <T> Array<out T>.lastOrNull(predicate: (T) -> Boolean): T? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun ByteArray.lastOrNull(predicate: (Byte) -> Boolean): Byte? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun ShortArray.lastOrNull(predicate: (Short) -> Boolean): Short? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun IntArray.lastOrNull(predicate: (Int) -> Boolean): Int? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun LongArray.lastOrNull(predicate: (Long) -> Boolean): Long? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun FloatArray.lastOrNull(predicate: (Float) -> Boolean): Float? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun DoubleArray.lastOrNull(predicate: (Double) -> Boolean): Double? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the

last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun BooleanArray.lastOrNull(predicate: (Boolean) -> Boolean): Boolean? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun CharArray.lastOrNull(predicate: (Char) -> Boolean): Char? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun <T> Array<out T>.single(): T {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun ByteArray.single(): Byte {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun ShortArray.single(): Short {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun IntArray.single(): Int {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun LongArray.single(): Long {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun FloatArray.single(): Float {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun DoubleArray.single(): Double {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun BooleanArray.single(): Boolean {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the array is empty or has more than one element.\n */\npublic fun CharArray.single(): Char {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"Array is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Array has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun <T> Array<out T>.single(predicate: (T) -> Boolean): T {\n   var single: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as T\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun ByteArray.single(predicate: (Byte) -> Boolean): Byte {\n   var single: Byte? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Byte\n}\n\n/**\n * Returns the

single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun ShortArray.single(predicate: (Short) -> Boolean): Short {\n   var single: Short? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Short\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun IntArray.single(predicate: (Int) -> Boolean): Int {\n   var single: Int? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Int\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun LongArray.single(predicate: (Long) -> Boolean): Long {\n   var single: Long? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Long\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun FloatArray.single(predicate: (Float) -> Boolean): Float {\n   var single: Float? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Float\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun DoubleArray.single(predicate: (Double) -> Boolean): Double {\n   var single: Double? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Double\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun BooleanArray.single(predicate: (Boolean) -> Boolean): Boolean {\n   var single: Boolean? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Boolean\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun CharArray.single(predicate: (Char) -> Boolean): Char {\n   var single: Char? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Array contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Array contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Char\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun <T> Array<out T>.singleOrNull(): T? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun ByteArray.singleOrNull(): Byte? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun ShortArray.singleOrNull(): Short? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic

fun IntArray.singleOrNull(): Int? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun LongArray.singleOrNull(): Long? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun FloatArray.singleOrNull(): Float? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun DoubleArray.singleOrNull(): Double? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun BooleanArray.singleOrNull(): Boolean? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns single element, or `null` if the array is empty or has more than one element.\n */\npublic fun CharArray.singleOrNull(): Char? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun <T> Array<out T>.singleOrNull(predicate: (T) -> Boolean): T? {\n   var single: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun ByteArray.singleOrNull(predicate: (Byte) -> Boolean): Byte? {\n   var single: Byte? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun ShortArray.singleOrNull(predicate: (Short) -> Boolean): Short? {\n   var single: Short? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun IntArray.singleOrNull(predicate: (Int) -> Boolean): Int? {\n   var single: Int? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun LongArray.singleOrNull(predicate: (Long) -> Boolean): Long? {\n   var single: Long? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun FloatArray.singleOrNull(predicate: (Float) -> Boolean): Float? {\n   var single: Float? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun DoubleArray.singleOrNull(predicate: (Double) -> Boolean): Double? {\n   var single: Double? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun BooleanArray.singleOrNull(predicate: (Boolean) -> Boolean): Boolean? {\n   var single: Boolean? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic inline fun CharArray.singleOrNull(predicate: (Char) -> Boolean): Char? {\n   var single: Char? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample

samples.collections.Collections.Transformations.drop\n *\npublic fun <T> Array<out T>.drop(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun ByteArray.drop(n: Int): List<Byte> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun ShortArray.drop(n: Int): List<Short> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun IntArray.drop(n: Int): List<Int> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun LongArray.drop(n: Int): List<Long> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun FloatArray.drop(n: Int): List<Float> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun DoubleArray.drop(n: Int): List<Double> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun BooleanArray.drop(n: Int): List<Boolean> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun CharArray.drop(n: Int): List<Char> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return takeLast((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun <T> Array<out T>.dropLast(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun ByteArray.dropLast(n: Int): List<Byte> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun ShortArray.dropLast(n: Int): List<Short> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun IntArray.dropLast(n: Int): List<Int> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun LongArray.dropLast(n: Int): List<Long> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun FloatArray.dropLast(n: Int): List<Float> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n *\npublic fun DoubleArray.dropLast(n: Int): List<Double> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample

samples.collections.Collections.Transformations.drop\n */\npublic fun BooleanArray.dropLast(n: Int): List<Boolean> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic fun CharArray.dropLast(n: Int): List<Char> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun <T> Array<out T>.dropLastWhile(predicate: (T) -> Boolean): List<T> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun ByteArray.dropLastWhile(predicate: (Byte) -> Boolean): List<Byte> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun ShortArray.dropLastWhile(predicate: (Short) -> Boolean): List<Short> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun IntArray.dropLastWhile(predicate: (Int) -> Boolean): List<Int> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun LongArray.dropLastWhile(predicate: (Long) -> Boolean): List<Long> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun FloatArray.dropLastWhile(predicate: (Float) -> Boolean): List<Float> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun DoubleArray.dropLastWhile(predicate: (Double) -> Boolean): List<Double> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun BooleanArray.dropLastWhile(predicate: (Boolean) -> Boolean): List<Boolean> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun CharArray.dropLastWhile(predicate: (Char) -> Boolean): List<Char> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return take(index + 1)\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun <T> Array<out T>.dropWhile(predicate: (T) -> Boolean): List<T> {\n   var yielding = false\n   val list = ArrayList<T>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun ByteArray.dropWhile(predicate: (Byte) -> Boolean): List<Byte> {\n   var yielding = false\n   val list =

ArrayList<Byte>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun ShortArray.dropWhile(predicate: (Short) -> Boolean): List<Short> {\n   var yielding = false\n   val list = ArrayList<Short>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun IntArray.dropWhile(predicate: (Int) -> Boolean): List<Int> {\n   var yielding = false\n   val list = ArrayList<Int>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun LongArray.dropWhile(predicate: (Long) -> Boolean): List<Long> {\n   var yielding = false\n   val list = ArrayList<Long>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun FloatArray.dropWhile(predicate: (Float) -> Boolean): List<Float> {\n   var yielding = false\n   val list = ArrayList<Float>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun DoubleArray.dropWhile(predicate: (Double) -> Boolean): List<Double> {\n   var yielding = false\n   val list = ArrayList<Double>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun BooleanArray.dropWhile(predicate: (Boolean) -> Boolean): List<Boolean> {\n   var yielding = false\n   val list = ArrayList<Boolean>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing all elements except first elements that satisfy the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun CharArray.dropWhile(predicate: (Char) -> Boolean): List<Char> {\n   var yielding = false\n   val list = ArrayList<Char>()\n   for (item in this)\n   if (yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun <T> Array<out T>.filter(predicate: (T) -> Boolean): List<T> {\n   return filterTo(ArrayList<T>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun ByteArray.filter(predicate: (Byte) -> Boolean): List<Byte> {\n   return filterTo(ArrayList<Byte>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun ShortArray.filter(predicate: (Short) -> Boolean): List<Short> {\n   return filterTo(ArrayList<Short>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun IntArray.filter(predicate: (Int) -> Boolean): List<Int> {\n   return filterTo(ArrayList<Int>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun LongArray.filter(predicate: (Long) -> Boolean): List<Long> {\n   return filterTo(ArrayList<Long>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun FloatArray.filter(predicate: (Float) -> Boolean): List<Float> {\n   return filterTo(ArrayList<Float>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun DoubleArray.filter(predicate: (Double) -> Boolean): List<Double> {\n   return filterTo(ArrayList<Double>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given

[predicate].\n */\npublic inline fun BooleanArray.filter(predicate: (Boolean) -> Boolean): List<Boolean> {\n   return filterTo(ArrayList<Boolean>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic inline fun CharArray.filter(predicate: (Char) -> Boolean): List<Char> {\n   return filterTo(ArrayList<Char>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <T> Array<out T>.filterIndexed(predicate: (index: Int, T) -> Boolean): List<T> {\n   return filterIndexedTo(ArrayList<T>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun ByteArray.filterIndexed(predicate: (index: Int, Byte) -> Boolean): List<Byte> {\n   return filterIndexedTo(ArrayList<Byte>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun ShortArray.filterIndexed(predicate: (index: Int, Short) -> Boolean): List<Short> {\n   return filterIndexedTo(ArrayList<Short>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun IntArray.filterIndexed(predicate: (index: Int, Int) -> Boolean): List<Int> {\n   return filterIndexedTo(ArrayList<Int>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun LongArray.filterIndexed(predicate: (index: Int, Long) -> Boolean): List<Long> {\n   return filterIndexedTo(ArrayList<Long>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun FloatArray.filterIndexed(predicate: (index: Int, Float) -> Boolean): List<Float> {\n   return filterIndexedTo(ArrayList<Float>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun DoubleArray.filterIndexed(predicate: (index: Int, Double) -> Boolean): List<Double> {\n   return filterIndexedTo(ArrayList<Double>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun BooleanArray.filterIndexed(predicate: (index: Int, Boolean) -> Boolean): List<Boolean> {\n   return filterIndexedTo(ArrayList<Boolean>(), predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun CharArray.filterIndexed(predicate: (index: Int, Char) -> Boolean): List<Char> {\n   return filterIndexedTo(ArrayList<Char>(), predicate)\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <T, C : MutableCollection<in T>> Array<out T>.filterIndexedTo(destination: C, predicate: (index: Int, T) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Byte>> ByteArray.filterIndexedTo(destination: C, predicate: (index: Int, Byte) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of

predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Short>> ShortArray.filterIndexedTo(destination: C, predicate: (index: Int, Short) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Int>> IntArray.filterIndexedTo(destination: C, predicate: (index: Int, Int) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Long>> LongArray.filterIndexedTo(destination: C, predicate: (index: Int, Long) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Float>> FloatArray.filterIndexedTo(destination: C, predicate: (index: Int, Float) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Double>> DoubleArray.filterIndexedTo(destination: C, predicate: (index: Int, Double) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Boolean>> BooleanArray.filterIndexedTo(destination: C, predicate: (index: Int, Boolean) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline fun <C : MutableCollection<in Char>> CharArray.filterIndexedTo(destination: C, predicate: (index: Int, Char) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Returns a list containing all elements that are instances of specified type parameter R.\n */\npublic inline fun <reified R> Array<*>.filterIsInstance(): List<@kotlin.internal.NoInfer R> {\n   return filterIsInstanceTo(ArrayList<R>())\n}\n\n/**\n * Appends all elements that are instances of specified type parameter R to the given [destination].\n */\npublic inline fun <reified R, C : MutableCollection<in R>> Array<*>.filterIsInstanceTo(destination: C): C {\n   for (element in this) if (element is R) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun <T> Array<out T>.filterNot(predicate: (T) -> Boolean): List<T> {\n   return filterNotTo(ArrayList<T>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun ByteArray.filterNot(predicate: (Byte) -> Boolean): List<Byte> {\n   return filterNotTo(ArrayList<Byte>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun ShortArray.filterNot(predicate: (Short) -> Boolean): List<Short> {\n   return filterNotTo(ArrayList<Short>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun IntArray.filterNot(predicate: (Int) -> Boolean): List<Int> {\n   return filterNotTo(ArrayList<Int>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun LongArray.filterNot(predicate: (Long) -> Boolean): List<Long> {\n   return filterNotTo(ArrayList<Long>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the

given [predicate].\n */\npublic inline fun FloatArray.filterNot(predicate: (Float) -> Boolean): List<Float> {\n return filterNotTo(ArrayList<Float>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun DoubleArray.filterNot(predicate: (Double) -> Boolean): List<Double> {\n   return filterNotTo(ArrayList<Double>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun BooleanArray.filterNot(predicate: (Boolean) -> Boolean): List<Boolean> {\n   return filterNotTo(ArrayList<Boolean>(), predicate)\n}\n\n/**\n * Returns a list containing all elements not matching the given [predicate].\n */\npublic inline fun CharArray.filterNot(predicate: (Char) -> Boolean): List<Char> {\n   return filterNotTo(ArrayList<Char>(), predicate)\n}\n\n/**\n * Returns a list containing all elements that are not `null`.\n */\npublic fun <T : Any> Array<out T?>.filterNotNull(): List<T> {\n   return filterNotNullTo(ArrayList<T>())\n}\n\n/**\n * Appends all elements that are not `null` to the given [destination].\n */\npublic fun <C : MutableCollection<in T>, T : Any> Array<out T?>.filterNotNullTo(destination: C): C {\n   for (element in this) if (element != null) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <T, C : MutableCollection<in T>> Array<out T>.filterNotTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Byte>> ByteArray.filterNotTo(destination: C, predicate: (Byte) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Short>> ShortArray.filterNotTo(destination: C, predicate: (Short) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Int>> IntArray.filterNotTo(destination: C, predicate: (Int) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Long>> LongArray.filterNotTo(destination: C, predicate: (Long) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Float>> FloatArray.filterNotTo(destination: C, predicate: (Float) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Double>> DoubleArray.filterNotTo(destination: C, predicate: (Double) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Boolean>> BooleanArray.filterNotTo(destination: C, predicate: (Boolean) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Char>> CharArray.filterNotTo(destination: C, predicate: (Char) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <T, C : MutableCollection<in T>> Array<out T>.filterTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Byte>> ByteArray.filterTo(destination: C, predicate: (Byte) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Short>> ShortArray.filterTo(destination: C, predicate: (Short) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n

*/\npublic inline fun <C : MutableCollection<in Int>> IntArray.filterTo(destination: C, predicate: (Int) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Long>> LongArray.filterTo(destination: C, predicate: (Long) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Float>> FloatArray.filterTo(destination: C, predicate: (Float) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Double>> DoubleArray.filterTo(destination: C, predicate: (Double) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Boolean>> BooleanArray.filterTo(destination: C, predicate: (Boolean) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : MutableCollection<in Char>> CharArray.filterTo(destination: C, predicate: (Char) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun <T> Array<out T>.slice(indices: IntRange): List<T> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun ByteArray.slice(indices: IntRange): List<Byte> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun ShortArray.slice(indices: IntRange): List<Short> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun IntArray.slice(indices: IntRange): List<Int> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun LongArray.slice(indices: IntRange): List<Long> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun FloatArray.slice(indices: IntRange): List<Float> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun DoubleArray.slice(indices: IntRange): List<Double> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun BooleanArray.slice(indices: IntRange): List<Boolean> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun CharArray.slice(indices: IntRange): List<Char> {\n   if (indices.isEmpty()) return listOf()\n   return copyOfRange(indices.start, indices.endInclusive + 1).asList()\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun <T> Array<out T>.slice(indices: Iterable<Int>): List<T> {\n   val size = indices.collectionSizeOrDefault(10)\n   if (size == 0) return emptyList()\n   val list = ArrayList<T>(size)\n   for (index in indices) {\n   list.add(get(index))\n   }\n   return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun ByteArray.slice(indices: Iterable<Int>): List<Byte> {\n   val size = indices.collectionSizeOrDefault(10)\n   if (size == 0) return emptyList()\n   val list = ArrayList<Byte>(size)\n   for (index in indices) {\n   list.add(get(index))\n   }\n   return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun ShortArray.slice(indices: Iterable<Int>): List<Short> {\n   val size = indices.collectionSizeOrDefault(10)\n   if (size == 0) return emptyList()\n   val list = ArrayList<Short>(size)\n   for (index in indices) {\n

list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun IntArray.slice(indices: Iterable<Int>): List<Int> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Int>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun LongArray.slice(indices: Iterable<Int>): List<Long> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Long>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun FloatArray.slice(indices: Iterable<Int>): List<Float> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Float>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun DoubleArray.slice(indices: Iterable<Int>): List<Double> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Double>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun BooleanArray.slice(indices: Iterable<Int>): List<Boolean> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Boolean>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun CharArray.slice(indices: Iterable<Int>): List<Char> {\n val size = indices.collectionSizeOrDefault(10)\n if (size == 0) return emptyList()\n val list = ArrayList<Char>(size)\n for (index in indices) {\n   list.add(get(index))\n }\n return list\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun <T> Array<T>.sliceArray(indices: Collection<Int>): Array<T> {\n val result = arrayOfNulls(this, indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun ByteArray.sliceArray(indices: Collection<Int>): ByteArray {\n val result = ByteArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun ShortArray.sliceArray(indices: Collection<Int>): ShortArray {\n val result = ShortArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun IntArray.sliceArray(indices: Collection<Int>): IntArray {\n val result = IntArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun LongArray.sliceArray(indices: Collection<Int>): LongArray {\n val result = LongArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun FloatArray.sliceArray(indices: Collection<Int>): FloatArray {\n val result = FloatArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun DoubleArray.sliceArray(indices: Collection<Int>): DoubleArray {\n val result = DoubleArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun BooleanArray.sliceArray(indices: Collection<Int>): BooleanArray {\n val result = BooleanArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns an array containing elements of this array at specified [indices].\n */\npublic fun CharArray.sliceArray(indices: Collection<Int>): CharArray {\n val result = CharArray(indices.size)\n var targetIndex = 0\n for (sourceIndex in indices) {\n   result[targetIndex++] = this[sourceIndex]\n }\n return result\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun <T> Array<T>.sliceArray(indices: IntRange): Array<T> {\n if (indices.isEmpty()) return copyOfRange(0, 0)\n

return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun ByteArray.sliceArray(indices: IntRange): ByteArray {\n   if (indices.isEmpty()) return ByteArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun ShortArray.sliceArray(indices: IntRange): ShortArray {\n   if (indices.isEmpty()) return ShortArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun IntArray.sliceArray(indices: IntRange): IntArray {\n   if (indices.isEmpty()) return IntArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun LongArray.sliceArray(indices: IntRange): LongArray {\n   if (indices.isEmpty()) return LongArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun FloatArray.sliceArray(indices: IntRange): FloatArray {\n   if (indices.isEmpty()) return FloatArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun DoubleArray.sliceArray(indices: IntRange): DoubleArray {\n   if (indices.isEmpty()) return DoubleArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun BooleanArray.sliceArray(indices: IntRange): BooleanArray {\n   if (indices.isEmpty()) return BooleanArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun CharArray.sliceArray(indices: IntRange): CharArray {\n   if (indices.isEmpty()) return CharArray(0)\n   return copyOfRange(indices.start, indices.endInclusive + 1)\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun <T> Array<out T>.take(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<T>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun ByteArray.take(n: Int): List<Byte> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Byte>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun ShortArray.take(n: Int): List<Short> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Short>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun IntArray.take(n: Int): List<Int> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Int>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun LongArray.take(n: Int): List<Long> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Long>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun FloatArray.take(n: Int): List<Float> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Float>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns

a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun DoubleArray.take(n: Int): List<Double> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Double>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun BooleanArray.take(n: Int): List<Boolean> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Boolean>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun CharArray.take(n: Int): List<Char> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[0])\n   var count = 0\n   val list = ArrayList<Char>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun <T> Array<out T>.takeLast(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<T>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun ByteArray.takeLast(n: Int): List<Byte> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Byte>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun ShortArray.takeLast(n: Int): List<Short> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Short>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun IntArray.takeLast(n: Int): List<Int> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Int>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun LongArray.takeLast(n: Int): List<Long> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Long>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun FloatArray.takeLast(n: Int): List<Float> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Float>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun DoubleArray.takeLast(n: Int): List<Double> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Double>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun BooleanArray.takeLast(n: Int): List<Boolean> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return

emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Boolean>(n)\n   for (index in size - n until size)\n   list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun CharArray.takeLast(n: Int): List<Char> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(this[size - 1])\n   val list = ArrayList<Char>(n)\n   for (index in size - n until size)\n list.add(this[index])\n   return list\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun <T> Array<out T>.takeLastWhile(predicate: (T) -> Boolean): List<T> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun ByteArray.takeLastWhile(predicate: (Byte) -> Boolean): List<Byte> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun ShortArray.takeLastWhile(predicate: (Short) -> Boolean): List<Short> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun IntArray.takeLastWhile(predicate: (Int) -> Boolean): List<Int> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun LongArray.takeLastWhile(predicate: (Long) -> Boolean): List<Long> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun FloatArray.takeLastWhile(predicate: (Float) -> Boolean): List<Float> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun DoubleArray.takeLastWhile(predicate: (Double) -> Boolean): List<Double> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun BooleanArray.takeLastWhile(predicate: (Boolean) -> Boolean): List<Boolean> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun CharArray.takeLastWhile(predicate: (Char) -> Boolean): List<Char> {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return drop(index + 1)\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun <T> Array<out T>.takeWhile(predicate: (T) -> Boolean): List<T> {\n   val list = ArrayList<T>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun ByteArray.takeWhile(predicate: (Byte) -> Boolean): List<Byte> {\n   val list = ArrayList<Byte>()\n   for (item in this) {\n   if (!predicate(item))\n break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun ShortArray.takeWhile(predicate: (Short) -> Boolean): List<Short> {\n   val list = ArrayList<Short>()\n   for (item

in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun IntArray.takeWhile(predicate: (Int) -> Boolean): List<Int> {\n   val list = ArrayList<Int>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun LongArray.takeWhile(predicate: (Long) -> Boolean): List<Long> {\n   val list = ArrayList<Long>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun FloatArray.takeWhile(predicate: (Float) -> Boolean): List<Float> {\n   val list = ArrayList<Float>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun DoubleArray.takeWhile(predicate: (Double) -> Boolean): List<Double> {\n   val list = ArrayList<Double>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun BooleanArray.takeWhile(predicate: (Boolean) -> Boolean): List<Boolean> {\n   val list = ArrayList<Boolean>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun CharArray.takeWhile(predicate: (Char) -> Boolean): List<Char> {\n   val list = ArrayList<Char>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun <T> Array<T>.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun ByteArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun ShortArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun IntArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun LongArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun FloatArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun DoubleArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun BooleanArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Reverses elements in the array in-place.\n */\npublic fun CharArray.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0)

return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun <T> Array<out T>.reversed(): List<T> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun ByteArray.reversed(): List<Byte> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun ShortArray.reversed(): List<Short> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun IntArray.reversed(): List<Int> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun LongArray.reversed(): List<Long> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun FloatArray.reversed(): List<Float> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun DoubleArray.reversed(): List<Double> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun BooleanArray.reversed(): List<Boolean> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun CharArray.reversed(): List<Char> {\n   if (isEmpty()) return emptyList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun <T> Array<T>.reversedArray(): Array<T> {\n   if (isEmpty()) return this\n   val result = arrayOfNulls(this, size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun ByteArray.reversedArray(): ByteArray {\n   if (isEmpty()) return this\n   val result = ByteArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun ShortArray.reversedArray(): ShortArray {\n   if (isEmpty()) return this\n   val result = ShortArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun IntArray.reversedArray(): IntArray {\n   if (isEmpty()) return this\n   val result = IntArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun LongArray.reversedArray(): LongArray {\n   if (isEmpty()) return this\n   val result = LongArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun FloatArray.reversedArray(): FloatArray {\n   if (isEmpty()) return this\n   val result = FloatArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun DoubleArray.reversedArray(): DoubleArray {\n   if (isEmpty()) return this\n   val result = DoubleArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun BooleanArray.reversedArray(): BooleanArray {\n   if (isEmpty()) return this\n   val result = BooleanArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Returns an array with elements of this array in reversed order.\n */\npublic fun CharArray.reversedArray(): CharArray {\n   if (isEmpty()) return this\n   val result = CharArray(size)\n   val lastIndex = lastIndex\n   for (i in 0..lastIndex)\n   result[lastIndex - i] = this[i]\n   return result\n}\n\n/**\n * Sorts elements in the array in-place according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> Array<out T>.sortBy(crossinline selector: (T) -> R?): Unit {\n   if (size > 1) sortWith(compareBy(selector))\n}\n\n/**\n * Sorts elements in the array in-place descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R :

Comparable<R>> Array<out T>.sortByDescending(crossinline selector: (T) -> R?): Unit {\n   if (size > 1) sortWith(compareByDescending(selector))\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Array<out T>.sortDescending(): Unit {\n   sortWith(reverseOrder())\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun ByteArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun ShortArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun IntArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun LongArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun FloatArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun DoubleArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Sorts elements in the array in-place descending according to their natural sort order.\n */\npublic fun CharArray.sortDescending(): Unit {\n   if (size > 1) {\n   sort()\n   reverse()\n   }\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Array<out T>.sorted(): List<T> {\n   return sortedArray().asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun ByteArray.sorted(): List<Byte> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun ShortArray.sorted(): List<Short> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun IntArray.sorted(): List<Int> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun LongArray.sorted(): List<Long> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun FloatArray.sorted(): List<Float> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun DoubleArray.sorted(): List<Double> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun CharArray.sorted(): List<Char> {\n   return toTypedArray().apply { sort() }.asList()\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Array<T>.sortedArray(): Array<T> {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun ByteArray.sortedArray(): ByteArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun ShortArray.sortedArray(): ShortArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun IntArray.sortedArray(): IntArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun LongArray.sortedArray(): LongArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun FloatArray.sortedArray(): FloatArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun DoubleArray.sortedArray(): DoubleArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according to their natural sort order.\n */\npublic fun CharArray.sortedArray(): CharArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sort() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Array<T>.sortedArrayDescending(): Array<T> {\n   if (isEmpty()) return this\n   return this.copyOf().apply {

sortWith(reverseOrder()) }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun ByteArray.sortedArrayDescending(): ByteArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun ShortArray.sortedArrayDescending(): ShortArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun IntArray.sortedArrayDescending(): IntArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun LongArray.sortedArrayDescending(): LongArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun FloatArray.sortedArrayDescending(): FloatArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun DoubleArray.sortedArrayDescending(): DoubleArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted descending according to their natural sort order.\n */\npublic fun CharArray.sortedArrayDescending(): CharArray {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortDescending() }\n}\n\n/**\n * Returns an array with all elements of this array sorted according the specified [comparator].\n */\npublic fun <T> Array<out T>.sortedArrayWith(comparator: Comparator<in T>): Array<out T> {\n   if (isEmpty()) return this\n   return this.copyOf().apply { sortWith(comparator) }\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> Array<out T>.sortedBy(crossinline selector: (T) -> R?): List<T> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> ByteArray.sortedBy(crossinline selector: (Byte) -> R?): List<Byte> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> ShortArray.sortedBy(crossinline selector: (Short) -> R?): List<Short> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> IntArray.sortedBy(crossinline selector: (Int) -> R?): List<Int> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> LongArray.sortedBy(crossinline selector: (Long) -> R?): List<Long> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> FloatArray.sortedBy(crossinline selector: (Float) -> R?): List<Float> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> DoubleArray.sortedBy(crossinline selector: (Double) -> R?): List<Double> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> BooleanArray.sortedBy(crossinline selector: (Boolean) -> R?): List<Boolean> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> CharArray.sortedBy(crossinline selector: (Char) -> R?): List<Char> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>>

Array<out T>.sortedByDescending(crossinline selector: (T) -> R?): List<T> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> ByteArray.sortedByDescending(crossinline selector: (Byte) -> R?): List<Byte> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> ShortArray.sortedByDescending(crossinline selector: (Short) -> R?): List<Short> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> IntArray.sortedByDescending(crossinline selector: (Int) -> R?): List<Int> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> LongArray.sortedByDescending(crossinline selector: (Long) -> R?): List<Long> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> FloatArray.sortedByDescending(crossinline selector: (Float) -> R?): List<Float> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> DoubleArray.sortedByDescending(crossinline selector: (Double) -> R?): List<Double> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> BooleanArray.sortedByDescending(crossinline selector: (Boolean) -> R?): List<Boolean> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <R : Comparable<R>> CharArray.sortedByDescending(crossinline selector: (Char) -> R?): List<Char> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Array<out T>.sortedDescending(): List<T> {\n   return sortedWith(reverseOrder())\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun ByteArray.sortedDescending(): List<Byte> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun ShortArray.sortedDescending(): List<Short> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun IntArray.sortedDescending(): List<Int> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun LongArray.sortedDescending(): List<Long> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun FloatArray.sortedDescending(): List<Float> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun DoubleArray.sortedDescending(): List<Double> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun CharArray.sortedDescending(): List<Char> {\n   return copyOf().apply { sort() }.reversed()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun <T> Array<out T>.sortedWith(comparator: Comparator<in T>): List<T> {\n   return sortedArrayWith(comparator).asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun ByteArray.sortedWith(comparator: Comparator<in Byte>): List<Byte> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun ShortArray.sortedWith(comparator: Comparator<in Short>): List<Short> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all

elements sorted according to the specified [comparator].\n */\npublic fun IntArray.sortedWith(comparator: Comparator<in Int>): List<Int> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun LongArray.sortedWith(comparator: Comparator<in Long>): List<Long> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun FloatArray.sortedWith(comparator: Comparator<in Float>): List<Float> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun DoubleArray.sortedWith(comparator: Comparator<in Double>): List<Double> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun BooleanArray.sortedWith(comparator: Comparator<in Boolean>): List<Boolean> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun CharArray.sortedWith(comparator: Comparator<in Char>): List<Char> {\n   return toTypedArray().apply { sortWith(comparator) }.asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\npublic fun <T> Array<out T>.asList(): List<T> {\n   return ArrayList<T>(this.unsafeCast<Array<Any?>>())\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.asList(): List<Byte> {\n   return this.unsafeCast<Array<Byte>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.asList(): List<Short> {\n   return this.unsafeCast<Array<Short>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.asList(): List<Int> {\n   return this.unsafeCast<Array<Int>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.asList(): List<Long> {\n   return this.unsafeCast<Array<Long>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.asList(): List<Float> {\n   return this.unsafeCast<Array<Float>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.asList(): List<Double> {\n   return this.unsafeCast<Array<Double>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.asList(): List<Boolean> {\n   return this.unsafeCast<Array<Boolean>>().asList()\n}\n\n/**\n * Returns a [List] that wraps the original array.\n */\npublic fun CharArray.asList(): List<Char> {\n   return object : AbstractList<Char>(), RandomAccess {\n   override val size: Int get() = this@asList.size\n   override fun isEmpty(): Boolean = this@asList.isEmpty()\n   override fun contains(element: Char): Boolean = this@asList.contains(element)\n   override fun get(index: Int): Char = this@asList[index]\n   override fun indexOf(element: Char): Int = this@asList.indexOf(element)\n   override fun lastIndexOf(element: Char): Int = this@asList.lastIndexOf(element)\n   }\n}\n\n/**\n * Returns `true` if the two specified arrays are *deeply* equal to one another,\n * i.e. contain the same number of the same elements in the same order.\n * \n * If two corresponding elements are nested arrays, they are also compared deeply.\n * If any of arrays contains itself on any nesting level the behavior is undefined.\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayDeepEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun <T> Array<out T>.contentDeepEquals(other: Array<out T>): Boolean {\n   definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n * Nested arrays are treated as lists too.\n * \n * If any of arrays contains itself on any nesting level the behavior is undefined.\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayDeepHashCode\")\npublic fun <T> Array<out T>.contentDeepHashCode(): Int {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of this array as if it is a [List].\n * Nested arrays are treated as lists too.\n * \n * If any of arrays contains itself on any nesting level that reference\n * is rendered as `"[...]"` to prevent recursion.\n * \n * @sample samples.collections.Arrays.ContentOperations.contentDeepToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayDeepToString\")\npublic fun <T> Array<out T>.contentDeepToString(): String {\n   definedExternally\n}\n\n/**\n * Returns `true` if the two specified arrays

are *structurally* equal to one another,\n * i.e. contain the same number of the same elements in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
<T> Array<out T>.contentEquals(other: Array<out T>): Boolean {\n   definedExternally\n}\n\n/**\n * Returns
`true` if the two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the
same elements in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
ByteArray.contentEquals(other: ByteArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if the two
specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same elements in the
same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
ShortArray.contentEquals(other: ShortArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if the
two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same elements
in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
IntArray.contentEquals(other: IntArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if the two
specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same elements in the
same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
LongArray.contentEquals(other: LongArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if the
two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same elements
in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
FloatArray.contentEquals(other: FloatArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if the
two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same elements
in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
DoubleArray.contentEquals(other: DoubleArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if
the two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same
elements in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
BooleanArray.contentEquals(other: BooleanArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns `true` if
the two specified arrays are *structurally* equal to one another,\n * i.e. contain the same number of the same
elements in the same order.\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayEquals\")\n@Suppress(\"UNUSED_PARAMETER\")\npublic infix fun
CharArray.contentEquals(other: CharArray): Boolean {\n   definedExternally\n}\n\n/**\n * Returns a hash code
based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun <T> Array<out T>.contentHashCode(): Int
{\n   definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun ByteArray.contentHashCode(): Int {\n
definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun ShortArray.contentHashCode(): Int {\n
definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun IntArray.contentHashCode(): Int {\n
definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun LongArray.contentHashCode(): Int {\n
definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n
*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun FloatArray.contentHashCode(): Int {\n
definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n

*/\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun DoubleArray.contentHashCode(): Int {\n   definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun BooleanArray.contentHashCode(): Int {\n   definedExternally\n}\n\n/**\n * Returns a hash code based on the contents of this array as if it is [List].\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayHashCode\")\npublic fun CharArray.contentHashCode(): Int {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun <T> Array<out T>.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun ByteArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun ShortArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun IntArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun LongArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun FloatArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun DoubleArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun BooleanArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns a string representation of the contents of the specified array as if it is [List].\n * \n * @sample samples.collections.Arrays.ContentOperations.contentToString\n */\n@SinceKotlin(\"1.1\")\n@library(\"arrayToString\")\npublic fun CharArray.contentToString(): String {\n   definedExternally\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun <T> Array<out T>.copyOf(): Array<T> {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun ByteArray.copyOf(): ByteArray {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun ShortArray.copyOf(): ShortArray {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun IntArray.copyOf(): IntArray {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\npublic fun LongArray.copyOf(): LongArray {\n   return withType(\"LongArray\", this.asDynamic().slice())\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun FloatArray.copyOf(): FloatArray {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun DoubleArray.copyOf(): DoubleArray {\n   return this.asDynamic().slice()\n}\n\n/**\n * Returns new array which is a copy of the original array.\n */\npublic fun BooleanArray.copyOf(): BooleanArray {\n   return withType(\"BooleanArray\", this.asDynamic().slice())\n}\n\n/**\n * Returns new array which is a copy of the

original array.\n */\npublic fun CharArray.copyOf(): CharArray {\n   return withType(\"CharArray\", this.asDynamic().slice())\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun ByteArray.copyOf(newSize: Int): ByteArray {\n   return fillFrom(this, ByteArray(newSize))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun ShortArray.copyOf(newSize: Int): ShortArray {\n   return fillFrom(this, ShortArray(newSize))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun IntArray.copyOf(newSize: Int): IntArray {\n   return fillFrom(this, IntArray(newSize))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun LongArray.copyOf(newSize: Int): LongArray {\n   return withType(\"LongArray\", arrayCopyResize(this, newSize, 0L))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun FloatArray.copyOf(newSize: Int): FloatArray {\n   return fillFrom(this, FloatArray(newSize))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun DoubleArray.copyOf(newSize: Int): DoubleArray {\n   return fillFrom(this, DoubleArray(newSize))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun BooleanArray.copyOf(newSize: Int): BooleanArray {\n   return withType(\"BooleanArray\", arrayCopyResize(this, newSize, false))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun CharArray.copyOf(newSize: Int): CharArray {\n   return withType(\"CharArray\", fillFrom(this, CharArray(newSize)))\n}\n\n/**\n * Returns new array which is a copy of the original array, resized to the given [newSize].\n */\npublic fun <T> Array<out T>.copyOf(newSize: Int): Array<T?> {\n   return arrayCopyResize(this, newSize, null)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun <T> Array<out T>.copyOfRange(fromIndex: Int, toIndex: Int): Array<T> {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun ByteArray.copyOfRange(fromIndex: Int, toIndex: Int): ByteArray {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun ShortArray.copyOfRange(fromIndex: Int, toIndex: Int): ShortArray {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun IntArray.copyOfRange(fromIndex: Int, toIndex: Int): IntArray {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\npublic fun LongArray.copyOfRange(fromIndex: Int, toIndex: Int): LongArray {\n   return withType(\"LongArray\", this.asDynamic().slice(fromIndex, toIndex))\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun FloatArray.copyOfRange(fromIndex: Int, toIndex: Int): FloatArray {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun DoubleArray.copyOfRange(fromIndex: Int, toIndex: Int): DoubleArray {\n   return this.asDynamic().slice(fromIndex, toIndex)\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\npublic fun BooleanArray.copyOfRange(fromIndex: Int, toIndex: Int): BooleanArray {\n   return withType(\"BooleanArray\", this.asDynamic().slice(fromIndex, toIndex))\n}\n\n/**\n * Returns new array which is a copy of range of original array.\n */\npublic fun CharArray.copyOfRange(fromIndex: Int, toIndex: Int): CharArray {\n   return withType(\"CharArray\", this.asDynamic().slice(fromIndex, toIndex))\n}\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val <T> Array<out T>.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val ByteArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val ShortArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val IntArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val LongArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the

range of valid indices for the array.\n */\npublic val FloatArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val DoubleArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val BooleanArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns the range of valid indices for the array.\n */\npublic val CharArray.indices: IntRange\n   get() = IntRange(0, lastIndex)\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.isEmpty(): Boolean {\n   return size == 0\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if the array is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.isNotEmpty(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns the last valid index for the array.\n */\npublic val <T> Array<out T>.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val ByteArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val ShortArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val IntArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val LongArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val FloatArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val DoubleArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val BooleanArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns the last valid index for the array.\n */\npublic val CharArray.lastIndex: Int\n   get() = size - 1\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun <T> Array<out T>.plus(element: T): Array<T> {\n   return this.asDynamic().concat(arrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun ByteArray.plus(element: Byte): ByteArray {\n   return plus(byteArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun

ShortArray.plus(element: Short): ShortArray {\n   return plus(shortArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun IntArray.plus(element: Int): IntArray {\n   return plus(intArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun LongArray.plus(element: Long): LongArray {\n   return plus(longArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun FloatArray.plus(element: Float): FloatArray {\n   return plus(floatArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun DoubleArray.plus(element: Double): DoubleArray {\n   return plus(doubleArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun BooleanArray.plus(element: Boolean): BooleanArray {\n   return plus(booleanArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun CharArray.plus(element: Char): CharArray {\n   return plus(charArrayOf(element))\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun <T> Array<out T>.plus(elements: Collection<T>): Array<T> {\n   return arrayPlusCollection(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun ByteArray.plus(elements: Collection<Byte>): ByteArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun ShortArray.plus(elements: Collection<Short>): ShortArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun IntArray.plus(elements: Collection<Int>): IntArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun LongArray.plus(elements: Collection<Long>): LongArray {\n   return arrayPlusCollection(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun FloatArray.plus(elements: Collection<Float>): FloatArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun DoubleArray.plus(elements: Collection<Double>): DoubleArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun BooleanArray.plus(elements: Collection<Boolean>): BooleanArray {\n   return arrayPlusCollection(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] collection.\n *\npublic operator fun CharArray.plus(elements: Collection<Char>): CharArray {\n   return fillFromCollection(this.copyOf(size + elements.size), this.size, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun <T> Array<out T>.plus(elements: Array<out T>): Array<T> {\n   return this.asDynamic().concat(elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun ByteArray.plus(elements: ByteArray): ByteArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n *\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun ShortArray.plus(elements: ShortArray):

ShortArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun IntArray.plus(elements: IntArray): IntArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun LongArray.plus(elements: LongArray): LongArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun FloatArray.plus(elements: FloatArray): FloatArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun DoubleArray.plus(elements: DoubleArray): DoubleArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun BooleanArray.plus(elements: BooleanArray): BooleanArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then all elements of the given [elements] array.\n
*/\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline operator fun CharArray.plus(elements: CharArray): CharArray {\n   return primitiveArrayConcat(this, elements)\n}\n\n/**\n * Returns an array containing all elements of the original array and then the given [element].\n */\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun <T> Array<out T>.plusElement(element: T): Array<T> {\n   return this.asDynamic().concat(arrayOf(element))\n}\n\n/**\n * Sorts the array in-place.\n
*/\n@library(\"primitiveArraySort\")\npublic fun IntArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place.\n */\npublic fun LongArray.sort(): Unit {\n   if (size > 1)\n   sort { a: Long, b: Long -> a.compareTo(b) }\n}\n\n/**\n * Sorts the array in-place.\n */\n@library(\"primitiveArraySort\")\npublic fun ByteArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place.\n
*/\n@library(\"primitiveArraySort\")\npublic fun ShortArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place.\n */\n@library(\"primitiveArraySort\")\npublic fun DoubleArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place.\n */\n@library(\"primitiveArraySort\")\npublic fun FloatArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place.\n
*/\n@library(\"primitiveArraySort\")\npublic fun CharArray.sort(): Unit {\n   definedExternally\n}\n\n/**\n * Sorts the array in-place according to the natural order of its elements.\n */\npublic fun <T: Comparable<T>> Array<out T>.sort(): Unit {\n   if (size > 1)\n   sort { a: T, b: T -> a.compareTo(b) }\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.sort(noinline comparison: (a: T, b: T) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.sort(noinline comparison: (a: Byte, b: Byte) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.sort(noinline comparison: (a: Short, b: Short) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.sort(noinline comparison: (a: Int, b: Int) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.sort(noinline comparison: (a: Long, b: Long) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.sort(noinline comparison: (a: Float, b: Float) -> Int): Unit {\n   asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to

the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.sort(noinline comparison: (a: Double, b: Double) -> Int): Unit {\n asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparison] function.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.sort(noinline comparison: (a: Char, b: Char) -> Int): Unit {\n asDynamic().sort(comparison)\n}\n\n/**\n * Sorts the array in-place according to the order specified by the given [comparator].\n */\npublic fun <T> Array<out T>.sortWith(comparator: Comparator<in T>): Unit {\n if (size > 1)\n sort { a, b -> comparator.compare(a, b) }\n}\n\n/**\n * Returns an array of Boolean containing all of the elements of this generic array.\n */\npublic fun Array<out Boolean>.toBooleanArray(): BooleanArray {\n val result = BooleanArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Byte containing all of the elements of this generic array.\n */\npublic fun Array<out Byte>.toByteArray(): ByteArray {\n val result = ByteArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Char containing all of the elements of this generic array.\n */\npublic fun Array<out Char>.toCharArray(): CharArray {\n val result = CharArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Double containing all of the elements of this generic array.\n */\npublic fun Array<out Double>.toDoubleArray(): DoubleArray {\n val result = DoubleArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Float containing all of the elements of this generic array.\n */\npublic fun Array<out Float>.toFloatArray(): FloatArray {\n val result = FloatArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Int containing all of the elements of this generic array.\n */\npublic fun Array<out Int>.toIntArray(): IntArray {\n val result = IntArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Long containing all of the elements of this generic array.\n */\npublic fun Array<out Long>.toLongArray(): LongArray {\n val result = LongArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns an array of Short containing all of the elements of this generic array.\n */\npublic fun Array<out Short>.toShortArray(): ShortArray {\n val result = ShortArray(size)\n for (index in indices)\n result[index] = this[index]\n return result\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun ByteArray.toTypedArray(): Array<Byte> {\n return js(\"[]\").slice.call(this)\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun ShortArray.toTypedArray(): Array<Short> {\n return js(\"[]\").slice.call(this)\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun IntArray.toTypedArray(): Array<Int> {\n return js(\"[]\").slice.call(this)\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun LongArray.toTypedArray(): Array<Long> {\n return copyOf().unsafeCast<Array<Long>>()\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun FloatArray.toTypedArray(): Array<Float> {\n return js(\"[]\").slice.call(this)\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun DoubleArray.toTypedArray(): Array<Double> {\n return js(\"[]\").slice.call(this)\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun BooleanArray.toTypedArray(): Array<Boolean> {\n return copyOf().unsafeCast<Array<Boolean>>()\n}\n\n/**\n * Returns a *typed* object array containing all of the elements of this primitive array.\n */\npublic fun CharArray.toTypedArray(): Array<Char> {\n return Array<Char>(size, { i -> this[i] })\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <T, K, V> Array<out T>.associate(transform: (T) -> Pair<K, V>): Map<K, V> {\n val capacity = mapCapacity(size).coerceAtLeast(16)\n return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the

map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> ByteArray.associate(transform: (Byte) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> ShortArray.associate(transform: (Short) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> IntArray.associate(transform: (Int) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> LongArray.associate(transform: (Long) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> FloatArray.associate(transform: (Float) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> DoubleArray.associate(transform: (Double) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> BooleanArray.associate(transform: (Boolean) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> CharArray.associate(transform: (Char) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <T, K> Array<out T>.associateBy(keySelector: (T) -> K): Map<K, T> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, T>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> ByteArray.associateBy(keySelector: (Byte) -> K): Map<K, Byte> {\n   val capacity =

mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Byte>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> ShortArray.associateBy(keySelector: (Short) -> K): Map<K, Short> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Short>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> IntArray.associateBy(keySelector: (Int) -> K): Map<K, Int> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Int>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> LongArray.associateBy(keySelector: (Long) -> K): Map<K, Long> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Long>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> FloatArray.associateBy(keySelector: (Float) -> K): Map<K, Float> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Float>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> DoubleArray.associateBy(keySelector: (Double) -> K): Map<K, Double> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Double>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> BooleanArray.associateBy(keySelector: (Boolean) -> K): Map<K, Boolean> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Boolean>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the elements from the given array indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K> CharArray.associateBy(keySelector: (Char) -> K): Map<K, Char> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Char>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <T, K, V> Array<out T>.associateBy(keySelector: (T) -> K, valueTransform: (T) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> ByteArray.associateBy(keySelector: (Byte) -> K,

valueTransform: (Byte) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> ShortArray.associateBy(keySelector: (Short) -> K, valueTransform: (Short) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> IntArray.associateBy(keySelector: (Int) -> K, valueTransform: (Int) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> LongArray.associateBy(keySelector: (Long) -> K, valueTransform: (Long) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> FloatArray.associateBy(keySelector: (Float) -> K, valueTransform: (Float) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> DoubleArray.associateBy(keySelector: (Double) -> K, valueTransform: (Double) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> BooleanArray.associateBy(keySelector: (Boolean) -> K, valueTransform: (Boolean) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original array.\n */\npublic inline fun <K, V> CharArray.associateBy(keySelector: (Char) -> K, valueTransform: (Char) -> V): Map<K, V> {\n   val capacity = mapCapacity(size).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <T, K, M : MutableMap<in K, in T>> Array<out T>.associateByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the

[keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Byte>> ByteArray.associateByTo(destination: M, keySelector: (Byte) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Short>> ShortArray.associateByTo(destination: M, keySelector: (Short) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Int>> IntArray.associateByTo(destination: M, keySelector: (Int) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Long>> LongArray.associateByTo(destination: M, keySelector: (Long) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Float>> FloatArray.associateByTo(destination: M, keySelector: (Float) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Double>> DoubleArray.associateByTo(destination: M, keySelector: (Double) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Boolean>> BooleanArray.associateByTo(destination: M, keySelector: (Boolean) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given array\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Char>> CharArray.associateByTo(destination: M, keySelector: (Char) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <T, K, V, M : MutableMap<in K, in V>> Array<out T>.associateByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the

given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> ByteArray.associateByTo(destination: M, keySelector: (Byte) -> K, valueTransform: (Byte) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> ShortArray.associateByTo(destination: M, keySelector: (Short) -> K, valueTransform: (Short) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> IntArray.associateByTo(destination: M, keySelector: (Int) -> K, valueTransform: (Int) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> LongArray.associateByTo(destination: M, keySelector: (Long) -> K, valueTransform: (Long) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> FloatArray.associateByTo(destination: M, keySelector: (Float) -> K, valueTransform: (Float) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> DoubleArray.associateByTo(destination: M, keySelector: (Double) -> K, valueTransform: (Double) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> BooleanArray.associateByTo(destination: M, keySelector: (Boolean) -> K, valueTransform: (Boolean) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given array.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> CharArray.associateByTo(destination: M, keySelector: (Char) -> K, valueTransform: (Char) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <T, K, V, M :

MutableMap<in K, in V>> Array<out T>.associateTo(destination: M, transform: (T) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> ByteArray.associateTo(destination: M, transform: (Byte) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> ShortArray.associateTo(destination: M, transform: (Short) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> IntArray.associateTo(destination: M, transform: (Int) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> LongArray.associateTo(destination: M, transform: (Long) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> FloatArray.associateTo(destination: M, transform: (Float) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> DoubleArray.associateTo(destination: M, transform: (Double) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> BooleanArray.associateTo(destination: M, transform: (Boolean) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given array.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> CharArray.associateTo(destination: M, transform: (Char) -> Pair<K, V>): M {\n for (element in this) {\n destination += transform(element)\n }\n return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <T, C : MutableCollection<in T>> Array<out T>.toCollection(destination: C): C {\n for (item in this) {\n destination.add(item)\n }\n return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Byte>> ByteArray.toCollection(destination: C): C {\n for (item in this) {\n destination.add(item)\n }\n return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Short>> ShortArray.toCollection(destination: C): C {\n for (item in this) {\n destination.add(item)\n }\n return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Int>> IntArray.toCollection(destination: C): C {\n for (item in this) {\n destination.add(item)\n }\n return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Long>> LongArray.toCollection(destination: C): C {\n for (item in this) {\n destination.add(item)\n }\n return

destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Float>> FloatArray.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Double>> DoubleArray.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Boolean>> BooleanArray.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Char>> CharArray.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun <T> Array<out T>.toHashSet(): HashSet<T> {\n   return toCollection(HashSet<T>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun ByteArray.toHashSet(): HashSet<Byte> {\n   return toCollection(HashSet<Byte>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun ShortArray.toHashSet(): HashSet<Short> {\n   return toCollection(HashSet<Short>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun IntArray.toHashSet(): HashSet<Int> {\n   return toCollection(HashSet<Int>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun LongArray.toHashSet(): HashSet<Long> {\n   return toCollection(HashSet<Long>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun FloatArray.toHashSet(): HashSet<Float> {\n   return toCollection(HashSet<Float>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun DoubleArray.toHashSet(): HashSet<Double> {\n   return toCollection(HashSet<Double>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun BooleanArray.toHashSet(): HashSet<Boolean> {\n   return toCollection(HashSet<Boolean>(mapCapacity(size)))\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun CharArray.toHashSet(): HashSet<Char> {\n   return toCollection(HashSet<Char>(mapCapacity(size)))\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun <T> Array<out T>.toList(): List<T> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun ByteArray.toList(): List<Byte> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun ShortArray.toList(): List<Short> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun IntArray.toList(): List<Int> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun LongArray.toList(): List<Long> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun FloatArray.toList(): List<Float> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun DoubleArray.toList(): List<Double> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun BooleanArray.toList(): List<Boolean> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun CharArray.toList(): List<Char> {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun <T> Array<out T>.toMutableList(): MutableList<T> {\n   return ArrayList(this.asCollection())\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun ByteArray.toMutableList(): MutableList<Byte> {\n   val list = ArrayList<Byte>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */

*/\npublic fun ShortArray.toMutableList(): MutableList<Short> {\n   val list = ArrayList<Short>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun IntArray.toMutableList(): MutableList<Int> {\n   val list = ArrayList<Int>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun LongArray.toMutableList(): MutableList<Long> {\n   val list = ArrayList<Long>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun FloatArray.toMutableList(): MutableList<Float> {\n   val list = ArrayList<Float>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun DoubleArray.toMutableList(): MutableList<Double> {\n   val list = ArrayList<Double>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun BooleanArray.toMutableList(): MutableList<Boolean> {\n   val list = ArrayList<Boolean>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this array.\n */\npublic fun CharArray.toMutableList(): MutableList<Char> {\n   val list = ArrayList<Char>(size)\n   for (item in this) list.add(item)\n   return list\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun <T> Array<out T>.toSet(): Set<T> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<T>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun ByteArray.toSet(): Set<Byte> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Byte>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun ShortArray.toSet(): Set<Short> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Short>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun IntArray.toSet(): Set<Int> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Int>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun LongArray.toSet(): Set<Long> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Long>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun FloatArray.toSet(): Set<Float> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Float>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun DoubleArray.toSet(): Set<Double> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Double>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun BooleanArray.toSet(): Set<Boolean> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Boolean>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun CharArray.toSet(): Set<Char> {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Char>(mapCapacity(size)))\n   }\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <T, R> Array<out T>.flatMap(transform: (T) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> ByteArray.flatMap(transform: (Byte) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> ShortArray.flatMap(transform: (Short) -> Iterable<R>): List<R> {\n   return

flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> IntArray.flatMap(transform: (Int) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> LongArray.flatMap(transform: (Long) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> FloatArray.flatMap(transform: (Float) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> DoubleArray.flatMap(transform: (Double) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> BooleanArray.flatMap(transform: (Boolean) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original array.\n */\npublic inline fun <R> CharArray.flatMap(transform: (Char) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Array<out T>.flatMapTo(destination: C, transform: (T) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> ByteArray.flatMapTo(destination: C, transform: (Byte) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> ShortArray.flatMapTo(destination: C, transform: (Short) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> IntArray.flatMapTo(destination: C, transform: (Int) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> LongArray.flatMapTo(destination: C, transform: (Long) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> FloatArray.flatMapTo(destination: C, transform: (Float) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> DoubleArray.flatMapTo(destination: C, transform: (Double) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> BooleanArray.flatMapTo(destination: C, transform: (Boolean) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original array, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>>

CharArray.flatMapTo(destination: C, transform: (Char) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <T, K> Array<out T>.groupBy(keySelector: (T) -> K): Map<K, List<T>> {\n   return groupByTo(LinkedHashMap<K, MutableList<T>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> ByteArray.groupBy(keySelector: (Byte) -> K): Map<K, List<Byte>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Byte>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> ShortArray.groupBy(keySelector: (Short) -> K): Map<K, List<Short>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Short>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> IntArray.groupBy(keySelector: (Int) -> K): Map<K, List<Int>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Int>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> LongArray.groupBy(keySelector: (Long) -> K): Map<K, List<Long>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Long>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> FloatArray.groupBy(keySelector: (Float) -> K): Map<K, List<Float>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Float>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> DoubleArray.groupBy(keySelector: (Double) -> K): Map<K, List<Double>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Double>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> BooleanArray.groupBy(keySelector: (Boolean) -> K): Map<K, List<Boolean>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Boolean>>(), keySelector)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and returns a map

where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> CharArray.groupBy(keySelector: (Char) -> K): Map<K, List<Char>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Char>>(), keySelector)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <T, K, V> Array<out T>.groupBy(keySelector: (T) -> K, valueTransform: (T) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> ByteArray.groupBy(keySelector: (Byte) -> K, valueTransform: (Byte) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> ShortArray.groupBy(keySelector: (Short) -> K, valueTransform: (Short) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> IntArray.groupBy(keySelector: (Int) -> K, valueTransform: (Int) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> LongArray.groupBy(keySelector: (Long) -> K, valueTransform: (Long) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> FloatArray.groupBy(keySelector: (Float) -> K, valueTransform: (Float) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated

with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> DoubleArray.groupBy(keySelector: (Double) -> K, valueTransform: (Double) -> V): Map<K, List<V>> {\n return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> BooleanArray.groupBy(keySelector: (Boolean) -> K, valueTransform: (Boolean) -> V): Map<K, List<V>> {\n return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original array.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> CharArray.groupBy(keySelector: (Char) -> K, valueTransform: (Char) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <T, K, M : MutableMap<in K, MutableList<T>>> Array<out T>.groupByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<T>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Byte>>> ByteArray.groupByTo(destination: M, keySelector: (Byte) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Byte>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Short>>> ShortArray.groupByTo(destination: M, keySelector: (Short) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Short>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Int>>> IntArray.groupByTo(destination: M, keySelector: (Int) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Int>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Long>>> LongArray.groupByTo(destination: M, keySelector: (Long) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list =

destination.getOrPut(key) { ArrayList<Long>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Float>>> FloatArray.groupByTo(destination: M, keySelector: (Float) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Float>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Double>>> DoubleArray.groupByTo(destination: M, keySelector: (Double) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Double>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Boolean>>> BooleanArray.groupByTo(destination: M, keySelector: (Boolean) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Boolean>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original array by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Char>>> CharArray.groupByTo(destination: M, keySelector: (Char) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Char>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <T, K, V, M : MutableMap<in K, MutableList<V>>> Array<out T>.groupByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> ByteArray.groupByTo(destination: M, keySelector: (Byte) -> K, valueTransform: (Byte) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> ShortArray.groupByTo(destination: M, keySelector: (Short) -> K, valueTransform: (Short) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the

original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> IntArray.groupByTo(destination: M, keySelector: (Int) -> K, valueTransform: (Int) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> LongArray.groupByTo(destination: M, keySelector: (Long) -> K, valueTransform: (Long) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> FloatArray.groupByTo(destination: M, keySelector: (Float) -> K, valueTransform: (Float) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> DoubleArray.groupByTo(destination: M, keySelector: (Double) -> K, valueTransform: (Double) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> BooleanArray.groupByTo(destination: M, keySelector: (Boolean) -> K, valueTransform: (Boolean) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original array\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> CharArray.groupByTo(destination: M, keySelector: (Char) -> K, valueTransform: (Char) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Creates a [Grouping] source from an array to be used later with one of group-and-fold operations\n * using the specified [keySelector] function to extract a key from each element.\n * \n * @sample samples.collections.Collections.Transformations.groupingByEachCount\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K> Array<out T>.groupingBy(crossinline keySelector: (T) -> K): Grouping<T, K> {\n   return object : Grouping<T, K> {\n   override fun sourceIterator(): Iterator<T> = this@groupingBy.iterator()\n   override fun keyOf(element: T): K = keySelector(element)\n   }\n}\n\n/**\n * Returns a list containing the results of applying

the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <T, R> Array<out T>.map(transform: (T) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> ByteArray.map(transform: (Byte) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> ShortArray.map(transform: (Short) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> IntArray.map(transform: (Int) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> LongArray.map(transform: (Long) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> FloatArray.map(transform: (Float) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> DoubleArray.map(transform: (Double) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> BooleanArray.map(transform: (Boolean) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <R> CharArray.map(transform: (Char) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R> Array<out T>.mapIndexed(transform: (index: Int, T) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> ByteArray.mapIndexed(transform: (index: Int, Byte) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> ShortArray.mapIndexed(transform: (index: Int, Short) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> IntArray.mapIndexed(transform: (index: Int, Int) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> LongArray.mapIndexed(transform: (index: Int, Long) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> FloatArray.mapIndexed(transform: (index: Int, Float) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and

returns the result of the transform applied to the element.\n */\npublic inline fun <R> DoubleArray.mapIndexed(transform: (index: Int, Double) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> BooleanArray.mapIndexed(transform: (index: Int, Boolean) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R> CharArray.mapIndexed(transform: (index: Int, Char) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each element and its index in the original array.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R : Any> Array<out T>.mapIndexedNotNull(transform: (index: Int, T) -> R?): List<R> {\n   return mapIndexedNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends only the non-null results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Array<out T>.mapIndexedNotNullTo(destination: C, transform: (index: Int, T) -> R?): C {\n   forEachIndexed { index, element -> transform(index, element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Array<out T>.mapIndexedTo(destination: C, transform: (index: Int, T) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> ByteArray.mapIndexedTo(destination: C, transform: (index: Int, Byte) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> ShortArray.mapIndexedTo(destination: C, transform: (index: Int, Short) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> IntArray.mapIndexedTo(destination: C, transform: (index: Int, Int) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> LongArray.mapIndexedTo(destination: C, transform: (index: Int, Long) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and

returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> FloatArray.mapIndexedTo(destination: C, transform: (index: Int, Float) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> DoubleArray.mapIndexedTo(destination: C, transform: (index: Int, Double) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> BooleanArray.mapIndexedTo(destination: C, transform: (index: Int, Boolean) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original array\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <R, C : MutableCollection<in R>> CharArray.mapIndexedTo(destination: C, transform: (index: Int, Char) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each element in the original array.\n */\npublic inline fun <T, R : Any> Array<out T>.mapNotNull(transform: (T) -> R?): List<R> {\n   return mapNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each element in the original array\n * and appends only the non-null results to the given [destination].\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Array<out T>.mapNotNullTo(destination: C, transform: (T) -> R?): C {\n   forEach { element -> transform(element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Array<out T>.mapTo(destination: C, transform: (T) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> ByteArray.mapTo(destination: C, transform: (Byte) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> ShortArray.mapTo(destination: C, transform: (Short) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> IntArray.mapTo(destination: C, transform: (Int) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> LongArray.mapTo(destination: C, transform: (Long) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> FloatArray.mapTo(destination: C, transform: (Float) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> DoubleArray.mapTo(destination: C, transform: (Double) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> BooleanArray.mapTo(destination: C, transform: (Boolean)

-> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original array\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> CharArray.mapTo(destination: C, transform: (Char) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun <T> Array<out T>.withIndex(): Iterable<IndexedValue<T>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun ByteArray.withIndex(): Iterable<IndexedValue<Byte>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun ShortArray.withIndex(): Iterable<IndexedValue<Short>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun IntArray.withIndex(): Iterable<IndexedValue<Int>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun LongArray.withIndex(): Iterable<IndexedValue<Long>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun FloatArray.withIndex(): Iterable<IndexedValue<Float>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun DoubleArray.withIndex(): Iterable<IndexedValue<Double>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun BooleanArray.withIndex(): Iterable<IndexedValue<Boolean>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original array.\n */\npublic fun CharArray.withIndex(): Iterable<IndexedValue<Char>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun <T> Array<out T>.distinct(): List<T> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun ByteArray.distinct(): List<Byte> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun ShortArray.distinct(): List<Short> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun IntArray.distinct(): List<Int> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun LongArray.distinct(): List<Long> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun FloatArray.distinct(): List<Float> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun DoubleArray.distinct(): List<Double> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun BooleanArray.distinct(): List<Boolean> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only distinct elements from the given array.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic fun CharArray.distinct(): List<Char> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <T, K> Array<out T>.distinctBy(selector: (T) -> K): List<T> {\n   val set = HashSet<K>()\n   val list = ArrayList<T>()\n   for (e in this) {\n   val key = selector(e)\n

if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> ByteArray.distinctBy(selector: (Byte) -> K): List<Byte> {\n   val set = HashSet<K>()\n   val list = ArrayList<Byte>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> ShortArray.distinctBy(selector: (Short) -> K): List<Short> {\n   val set = HashSet<K>()\n   val list = ArrayList<Short>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> IntArray.distinctBy(selector: (Int) -> K): List<Int> {\n   val set = HashSet<K>()\n   val list = ArrayList<Int>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> LongArray.distinctBy(selector: (Long) -> K): List<Long> {\n   val set = HashSet<K>()\n   val list = ArrayList<Long>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> FloatArray.distinctBy(selector: (Float) -> K): List<Float> {\n   val set = HashSet<K>()\n   val list = ArrayList<Float>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> DoubleArray.distinctBy(selector: (Double) -> K): List<Double> {\n   val set = HashSet<K>()\n   val list = ArrayList<Double>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> BooleanArray.distinctBy(selector: (Boolean) -> K): List<Boolean> {\n   val set = HashSet<K>()\n   val list = ArrayList<Boolean>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a list containing only elements from the given array\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source array.\n */\npublic inline fun <K> CharArray.distinctBy(selector: (Char) -> K): List<Char> {\n   val set = HashSet<K>()\n   val list = ArrayList<Char>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun <T> Array<out T>.intersect(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun ByteArray.intersect(other: Iterable<Byte>): Set<Byte> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun ShortArray.intersect(other: Iterable<Short>): Set<Short> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun IntArray.intersect(other: Iterable<Int>): Set<Int> {\n   val set = this.toMutableSet()\n

set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun LongArray.intersect(other: Iterable<Long>): Set<Long> {\n   val set = this.toMutableSet()\n set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun FloatArray.intersect(other: Iterable<Float>): Set<Float> {\n   val set = this.toMutableSet()\n set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun DoubleArray.intersect(other: Iterable<Double>): Set<Double> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun BooleanArray.intersect(other: Iterable<Boolean>): Set<Boolean> {\n val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun CharArray.intersect(other: Iterable<Char>): Set<Char> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun <T> Array<out T>.subtract(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun ByteArray.subtract(other: Iterable<Byte>): Set<Byte> {\n   val set = this.toMutableSet()\n set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun ShortArray.subtract(other: Iterable<Short>): Set<Short> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun IntArray.subtract(other: Iterable<Int>): Set<Int> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun LongArray.subtract(other: Iterable<Long>): Set<Long> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun FloatArray.subtract(other: Iterable<Float>): Set<Float> {\n   val set = this.toMutableSet()\n set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun DoubleArray.subtract(other: Iterable<Double>): Set<Double> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun BooleanArray.subtract(other: Iterable<Boolean>): Set<Boolean> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this array and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic infix fun CharArray.subtract(other: Iterable<Char>): Set<Char> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun <T> Array<out T>.toMutableSet(): MutableSet<T> {\n   val set = LinkedHashSet<T>(mapCapacity(size))\n   for (item in this)

set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun ByteArray.toMutableSet(): MutableSet<Byte> {\n   val set = LinkedHashSet<Byte>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun ShortArray.toMutableSet(): MutableSet<Short> {\n   val set = LinkedHashSet<Short>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun IntArray.toMutableSet(): MutableSet<Int> {\n   val set = LinkedHashSet<Int>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun LongArray.toMutableSet(): MutableSet<Long> {\n   val set = LinkedHashSet<Long>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun FloatArray.toMutableSet(): MutableSet<Float> {\n   val set = LinkedHashSet<Float>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun DoubleArray.toMutableSet(): MutableSet<Double> {\n   val set = LinkedHashSet<Double>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun BooleanArray.toMutableSet(): MutableSet<Boolean> {\n   val set = LinkedHashSet<Boolean>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given array.\n * \n * The returned set preserves the element iteration order of the original array.\n */\npublic fun CharArray.toMutableSet(): MutableSet<Char> {\n   val set = LinkedHashSet<Char>(mapCapacity(size))\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun <T> Array<out T>.union(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun ByteArray.union(other: Iterable<Byte>): Set<Byte> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun ShortArray.union(other: Iterable<Short>): Set<Short> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun IntArray.union(other: Iterable<Int>): Set<Int> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun LongArray.union(other: Iterable<Long>): Set<Long> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun FloatArray.union(other: Iterable<Float>): Set<Float> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set

containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun DoubleArray.union(other: Iterable<Double>): Set<Double> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun BooleanArray.union(other: Iterable<Boolean>): Set<Boolean> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original array.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun CharArray.union(other: Iterable<Char>): Set<Char> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun <T> Array<out T>.all(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun ByteArray.all(predicate: (Byte) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun ShortArray.all(predicate: (Short) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun IntArray.all(predicate: (Int) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun LongArray.all(predicate: (Long) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun FloatArray.all(predicate: (Float) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun DoubleArray.all(predicate: (Double) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun BooleanArray.all(predicate: (Boolean) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun CharArray.all(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun <T> Array<out T>.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun ByteArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun ShortArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun IntArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun LongArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun FloatArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample

samples.collections.Collections.Aggregates.any\n *\npublic fun DoubleArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n *\npublic fun BooleanArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if array has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n *\npublic fun CharArray.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun <T> Array<out T>.any(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun ByteArray.any(predicate: (Byte) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun ShortArray.any(predicate: (Short) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun IntArray.any(predicate: (Int) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun LongArray.any(predicate: (Long) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun FloatArray.any(predicate: (Float) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun DoubleArray.any(predicate: (Double) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun BooleanArray.any(predicate: (Boolean) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\npublic inline fun CharArray.any(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun ByteArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun ShortArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun IntArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun LongArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun FloatArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun DoubleArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun BooleanArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements in this array.\n *\n@kotlin.internal.InlineOnly\npublic inline fun CharArray.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n *\npublic inline fun <T> Array<out T>.count(predicate: (T) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n *\npublic inline fun ByteArray.count(predicate: (Byte) -> Boolean): Int {\n   var count = 0\n   for

(element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun ShortArray.count(predicate: (Short) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun IntArray.count(predicate: (Int) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun LongArray.count(predicate: (Long) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun FloatArray.count(predicate: (Float) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun DoubleArray.count(predicate: (Double) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun BooleanArray.count(predicate: (Boolean) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun CharArray.count(predicate: (Char) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <T, R> Array<out T>.fold(initial: R, operation: (acc: R, T) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> ByteArray.fold(initial: R, operation: (acc: R, Byte) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> ShortArray.fold(initial: R, operation: (acc: R, Short) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> IntArray.fold(initial: R, operation: (acc: R, Int) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> LongArray.fold(initial: R, operation: (acc: R, Long) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> FloatArray.fold(initial: R, operation: (acc: R, Float) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> DoubleArray.fold(initial: R, operation: (acc: R, Double) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> BooleanArray.fold(initial: R, operation: (acc: R, Boolean) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <R> CharArray.fold(initial: R, operation: (acc: R, Char) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element,

current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <T, R> Array<out T>.foldIndexed(initial: R, operation: (index: Int, acc: R, T) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> ByteArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Byte) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> ShortArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Short) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> IntArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Int) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> LongArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Long) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> FloatArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Float) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> DoubleArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Double) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> BooleanArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Boolean) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <R> CharArray.foldIndexed(initial: R, operation: (index: Int, acc: R, Char) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left

to each element and current accumulator value.\n *\npublic inline fun <T, R> Array<out T>.foldRight(initial: R, operation: (T, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> ByteArray.foldRight(initial: R, operation: (Byte, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> ShortArray.foldRight(initial: R, operation: (Short, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> IntArray.foldRight(initial: R, operation: (Int, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> LongArray.foldRight(initial: R, operation: (Long, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> FloatArray.foldRight(initial: R, operation: (Float, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> DoubleArray.foldRight(initial: R, operation: (Double, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0)\n   {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> BooleanArray.foldRight(initial: R, operation: (Boolean, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n *\npublic inline fun <R> CharArray.foldRight(initial: R, operation: (Char, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n *\npublic inline fun <T, R> Array<out T>.foldRightIndexed(initial: R, operation: (index: Int, T, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n *\npublic inline fun <R> ByteArray.foldRightIndexed(initial: R, operation: (index: Int, Byte, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n *\npublic inline fun <R> ShortArray.foldRightIndexed(initial: R, operation: (index: Int, Short, acc: R) -> R): R {\n   var index = lastIndex\n

var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> IntArray.foldRightIndexed(initial: R, operation: (index: Int, Int, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> LongArray.foldRightIndexed(initial: R, operation: (index: Int, Long, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> FloatArray.foldRightIndexed(initial: R, operation: (index: Int, Float, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> DoubleArray.foldRightIndexed(initial: R, operation: (index: Int, Double, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> BooleanArray.foldRightIndexed(initial: R, operation: (index: Int, Boolean, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> CharArray.foldRightIndexed(initial: R, operation: (index: Int, Char, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun <T> Array<out T>.forEach(action: (T) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun ByteArray.forEach(action: (Byte) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun ShortArray.forEach(action: (Short) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun IntArray.forEach(action: (Int) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun LongArray.forEach(action: (Long) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun FloatArray.forEach(action: (Float) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun DoubleArray.forEach(action: (Double) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n

*/\npublic inline fun BooleanArray.forEach(action: (Boolean) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element.\n */\npublic inline fun CharArray.forEach(action: (Char) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun <T> Array<out T>.forEachIndexed(action: (index: Int, T) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun ByteArray.forEachIndexed(action: (index: Int, Byte) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun ShortArray.forEachIndexed(action: (index: Int, Short) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun IntArray.forEachIndexed(action: (index: Int, Int) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun LongArray.forEachIndexed(action: (index: Int, Long) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun FloatArray.forEachIndexed(action: (index: Int, Float) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun DoubleArray.forEachIndexed(action: (index: Int, Double) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun BooleanArray.forEachIndexed(action: (index: Int, Boolean) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun CharArray.forEachIndexed(action: (index: Int, Char) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Array<out Double>.max(): Double? {\n   if (isEmpty()) return null\n   var max = this[0]\n   if (max.isNaN()) return max\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Array<out Float>.max(): Float? {\n   if (isEmpty()) return null\n   var max = this[0]\n   if (max.isNaN()) return max\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun <T : Comparable<T>> Array<out T>.max(): T? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun ByteArray.max(): Byte? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun ShortArray.max(): Short? {\n   if (isEmpty()) return null\n   var max = this[0]\n

for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun IntArray.max(): Int? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun LongArray.max(): Long? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\npublic fun FloatArray.max(): Float? {\n   if (isEmpty()) return null\n   var max = this[0]\n   if (max.isNaN()) return max\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\npublic fun DoubleArray.max(): Double? {\n   if (isEmpty()) return null\n   var max = this[0]\n   if (max.isNaN()) return max\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun CharArray.max(): Char? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <T, R : Comparable<R>> Array<out T>.maxBy(selector: (T) -> R): T? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> ByteArray.maxBy(selector: (Byte) -> R): Byte? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> ShortArray.maxBy(selector: (Short) -> R): Short? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> IntArray.maxBy(selector: (Int) -> R): Int? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> LongArray.maxBy(selector: (Long) -> R): Long? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> FloatArray.maxBy(selector: (Float) -> R): Float? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> DoubleArray.maxBy(selector: (Double) -> R): Double? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> BooleanArray.maxBy(selector: (Boolean) -> R): Boolean? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex)

{\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> CharArray.maxBy(selector: (Char) -> R): Char? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun <T> Array<out T>.maxWith(comparator: Comparator<in T>): T? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun ByteArray.maxWith(comparator: Comparator<in Byte>): Byte? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun ShortArray.maxWith(comparator: Comparator<in Short>): Short? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun IntArray.maxWith(comparator: Comparator<in Int>): Int? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun LongArray.maxWith(comparator: Comparator<in Long>): Long? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun FloatArray.maxWith(comparator: Comparator<in Float>): Float? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun DoubleArray.maxWith(comparator: Comparator<in Double>): Double? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun BooleanArray.maxWith(comparator: Comparator<in Boolean>): Boolean? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun CharArray.maxWith(comparator: Comparator<in Char>): Char? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Array<out Double>.min(): Double? {\n   if (isEmpty()) return null\n   var min = this[0]\n   if (min.isNaN()) return min\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Array<out Float>.min(): Float? {\n   if (isEmpty()) return null\n   var min = this[0]\n   if (min.isNaN()) return min\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun <T : Comparable<T>> Array<out T>.min(): T? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun ByteArray.min():

Byte? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun ShortArray.min(): Short? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun IntArray.min(): Int? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun LongArray.min(): Long? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\npublic fun FloatArray.min(): Float? {\n   if (isEmpty()) return null\n   var min = this[0]\n   if (min.isNaN()) return min\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\npublic fun DoubleArray.min(): Double? {\n   if (isEmpty()) return null\n   var min = this[0]\n   if (min.isNaN()) return min\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun CharArray.min(): Char? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <T, R : Comparable<R>> Array<out T>.minBy(selector: (T) -> R): T? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> ByteArray.minBy(selector: (Byte) -> R): Byte? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> ShortArray.minBy(selector: (Short) -> R): Short? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> IntArray.minBy(selector: (Int) -> R): Int? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> LongArray.minBy(selector: (Long) -> R): Long? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> FloatArray.minBy(selector: (Float) -> R): Float? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> DoubleArray.minBy(selector: (Double) -> R): Double? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n *

Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> BooleanArray.minBy(selector: (Boolean) -> R): Boolean? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <R : Comparable<R>> CharArray.minBy(selector: (Char) -> R): Char? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun <T> Array<out T>.minWith(comparator: Comparator<in T>): T? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun ByteArray.minWith(comparator: Comparator<in Byte>): Byte? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun ShortArray.minWith(comparator: Comparator<in Short>): Short? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun IntArray.minWith(comparator: Comparator<in Int>): Int? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun LongArray.minWith(comparator: Comparator<in Long>): Long? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun FloatArray.minWith(comparator: Comparator<in Float>): Float? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun DoubleArray.minWith(comparator: Comparator<in Double>): Double? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun BooleanArray.minWith(comparator: Comparator<in Boolean>): Boolean? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun CharArray.minWith(comparator: Comparator<in Char>): Char? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun <T> Array<out T>.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun ByteArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun ShortArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun IntArray.none(): Boolean {\n   return

isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun LongArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun FloatArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun DoubleArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun BooleanArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if the array has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun CharArray.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun <T> Array<out T>.none(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun ByteArray.none(predicate: (Byte) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun ShortArray.none(predicate: (Short) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun IntArray.none(predicate: (Int) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun LongArray.none(predicate: (Long) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun FloatArray.none(predicate: (Float) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun DoubleArray.none(predicate: (Double) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun BooleanArray.none(predicate: (Boolean) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false   return true\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun CharArray.none(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <S, T: S> Array<out T>.reduce(operation: (acc: S, T) -> S): S {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator: S = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun ByteArray.reduce(operation: (acc: Byte, Byte) -> Byte): Byte {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun ShortArray.reduce(operation: (acc: Short, Short) -> Short): Short {\n

if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun IntArray.reduce(operation: (acc: Int, Int) -> Int): Int {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun LongArray.reduce(operation: (acc: Long, Long) -> Long): Long {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun FloatArray.reduce(operation: (acc: Float, Float) -> Float): Float {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun DoubleArray.reduce(operation: (acc: Double, Double) -> Double): Double {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun BooleanArray.reduce(operation: (acc: Boolean, Boolean) -> Boolean): Boolean {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun CharArray.reduce(operation: (acc: Char, Char) -> Char): Char {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun <S, T: S> Array<out T>.reduceIndexed(operation: (index: Int, acc: S, T) -> S): S {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator: S = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun ByteArray.reduceIndexed(operation: (index: Int, acc: Byte, Byte) -> Byte): Byte {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun ShortArray.reduceIndexed(operation: (index: Int, acc: Short, Short) -> Short): Short {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return

accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun IntArray.reduceIndexed(operation: (index: Int, acc: Int, Int) -> Int): Int {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun LongArray.reduceIndexed(operation: (index: Int, acc: Long, Long) -> Long): Long {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun FloatArray.reduceIndexed(operation: (index: Int, acc: Float, Float) -> Float): Float {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun DoubleArray.reduceIndexed(operation: (index: Int, acc: Double, Double) -> Double): Double {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun BooleanArray.reduceIndexed(operation: (index: Int, acc: Boolean, Boolean) -> Boolean): Boolean {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original array.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun CharArray.reduceIndexed(operation: (index: Int, acc: Char, Char) -> Char): Char {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun <S, T: S> Array<out T>.reduceRight(operation: (T, acc: S) -> S): S {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator: S = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun ByteArray.reduceRight(operation: (Byte, acc: Byte) -> Byte): Byte {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n

}\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun ShortArray.reduceRight(operation: (Short, acc: Short) -> Short): Short {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun IntArray.reduceRight(operation: (Int, acc: Int) -> Int): Int {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun LongArray.reduceRight(operation: (Long, acc: Long) -> Long): Long {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun FloatArray.reduceRight(operation: (Float, acc: Float) -> Float): Float {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun DoubleArray.reduceRight(operation: (Double, acc: Double) -> Double): Double {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun BooleanArray.reduceRight(operation: (Boolean, acc: Boolean) -> Boolean): Boolean {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun CharArray.reduceRight(operation: (Char, acc: Char) -> Char): Char {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <S, T: S> Array<out T>.reduceRightIndexed(operation: (index: Int, T, acc: S) -> S): S {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator: S = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun ByteArray.reduceRightIndexed(operation: (index: Int, Byte, acc: Byte) -> Byte): Byte {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation]

function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun ShortArray.reduceRightIndexed(operation: (index: Int, Short, acc: Short) -> Short): Short {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun IntArray.reduceRightIndexed(operation: (index: Int, Int, acc: Int) -> Int): Int {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun LongArray.reduceRightIndexed(operation: (index: Int, Long, acc: Long) -> Long): Long {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun FloatArray.reduceRightIndexed(operation: (index: Int, Float, acc: Float) -> Float): Float {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun DoubleArray.reduceRightIndexed(operation: (index: Int, Double, acc: Double) -> Double): Double {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun BooleanArray.reduceRightIndexed(operation: (index: Int, Boolean, acc: Boolean) -> Boolean): Boolean {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original array and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun CharArray.reduceRightIndexed(operation: (index: Int, Char, acc: Char) -> Char): Char {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty array can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun <T> Array<out T>.sumBy(selector: (T) -> Int): Int {\n   var sum:

Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun ByteArray.sumBy(selector: (Byte) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun ShortArray.sumBy(selector: (Short) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun IntArray.sumBy(selector: (Int) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun LongArray.sumBy(selector: (Long) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun FloatArray.sumBy(selector: (Float) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun DoubleArray.sumBy(selector: (Double) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun BooleanArray.sumBy(selector: (Boolean) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun CharArray.sumBy(selector: (Char) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun <T> Array<out T>.sumByDouble(selector: (T) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun ByteArray.sumByDouble(selector: (Byte) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun ShortArray.sumByDouble(selector: (Short) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun IntArray.sumByDouble(selector: (Int) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun LongArray.sumByDouble(selector: (Long) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun FloatArray.sumByDouble(selector: (Float) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun DoubleArray.sumByDouble(selector: (Double) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun BooleanArray.sumByDouble(selector: (Boolean) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the array.\n */\npublic inline fun CharArray.sumByDouble(selector: (Char) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns an original collection containing all the non-`null` elements, throwing an [IllegalArgumentException] if there are any `null` elements.\n */\npublic fun <T : Any> Array<T?>.requireNoNulls(): Array<T> {\n   for (element in this)

{\n   if (element == null) {\n   throw IllegalArgumentException(\"null element found in $this.\")\n   }\n   }\n   @Suppress(\"UNCHECKED_CAST\")\n   return this as Array<T>\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun <T> Array<out T>.partition(predicate: (T) -> Boolean): Pair<List<T>, List<T>> {\n   val first = ArrayList<T>()\n   val second = ArrayList<T>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun ByteArray.partition(predicate: (Byte) -> Boolean): Pair<List<Byte>, List<Byte>> {\n   val first = ArrayList<Byte>()\n   val second = ArrayList<Byte>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun ShortArray.partition(predicate: (Short) -> Boolean): Pair<List<Short>, List<Short>> {\n   val first = ArrayList<Short>()\n   val second = ArrayList<Short>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun IntArray.partition(predicate: (Int) -> Boolean): Pair<List<Int>, List<Int>> {\n   val first = ArrayList<Int>()\n   val second = ArrayList<Int>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun LongArray.partition(predicate: (Long) -> Boolean): Pair<List<Long>, List<Long>> {\n   val first = ArrayList<Long>()\n   val second = ArrayList<Long>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun FloatArray.partition(predicate: (Float) -> Boolean): Pair<List<Float>, List<Float>> {\n   val first = ArrayList<Float>()\n   val second = ArrayList<Float>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun DoubleArray.partition(predicate: (Double) -> Boolean): Pair<List<Double>, List<Double>> {\n   val first = ArrayList<Double>()\n   val second = ArrayList<Double>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun BooleanArray.partition(predicate: (Boolean) -> Boolean): Pair<List<Boolean>, List<Boolean>> {\n   val first = ArrayList<Boolean>()\n   val second = ArrayList<Boolean>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original array into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun CharArray.partition(predicate: (Char) -> Boolean): Pair<List<Char>, List<Char>> {\n   val first = ArrayList<Char>()\n   val second = ArrayList<Char>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has

length of shortest collection.\n */\npublic infix fun <T, R> Array<out T>.zip(other: Array<out R>): List<Pair<T, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> ByteArray.zip(other: Array<out R>): List<Pair<Byte, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> ShortArray.zip(other: Array<out R>): List<Pair<Short, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> IntArray.zip(other: Array<out R>): List<Pair<Int, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> LongArray.zip(other: Array<out R>): List<Pair<Long, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> FloatArray.zip(other: Array<out R>): List<Pair<Float, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> DoubleArray.zip(other: Array<out R>): List<Pair<Double, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> BooleanArray.zip(other: Array<out R>): List<Pair<Boolean, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <R> CharArray.zip(other: Array<out R>): List<Pair<Char, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <T, R, V> Array<out T>.zip(other: Array<out R>, transform: (a: T, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> ByteArray.zip(other: Array<out R>, transform: (a: Byte, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> ShortArray.zip(other: Array<out R>, transform: (a: Short, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> IntArray.zip(other: Array<out R>, transform: (a: Int, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> LongArray.zip(other: Array<out R>, transform: (a: Long, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> FloatArray.zip(other: Array<out R>, transform: (a: Float, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> DoubleArray.zip(other: Array<out R>, transform: (a: Double, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided

[transform]. List has length of shortest collection.\n *\npublic inline fun <R, V> BooleanArray.zip(other: Array<out R>, transform: (a: Boolean, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n *\npublic inline fun <R, V> CharArray.zip(other: Array<out R>, transform: (a: Char, b: R) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <T, R> Array<out T>.zip(other: Iterable<R>): List<Pair<T, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> ByteArray.zip(other: Iterable<R>): List<Pair<Byte, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> ShortArray.zip(other: Iterable<R>): List<Pair<Short, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> IntArray.zip(other: Iterable<R>): List<Pair<Int, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> LongArray.zip(other: Iterable<R>): List<Pair<Long, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> FloatArray.zip(other: Iterable<R>): List<Pair<Float, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> DoubleArray.zip(other: Iterable<R>): List<Pair<Double, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> BooleanArray.zip(other: Iterable<R>): List<Pair<Boolean, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n *\npublic infix fun <R> CharArray.zip(other: Iterable<R>): List<Pair<Char, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n *\npublic inline fun <T, R, V> Array<out T>.zip(other: Iterable<R>, transform: (a: T, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n *\npublic inline fun <R, V> ByteArray.zip(other: Iterable<R>, transform: (a: Byte, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n *\npublic inline fun <R, V> ShortArray.zip(other: Iterable<R>, transform: (a: Short, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n *\npublic inline fun <R, V> IntArray.zip(other: Iterable<R>, transform: (a: Int, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length

of shortest collection.\n */\npublic inline fun <R, V> LongArray.zip(other: Iterable<R>, transform: (a: Long, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> FloatArray.zip(other: Iterable<R>, transform: (a: Float, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> DoubleArray.zip(other: Iterable<R>, transform: (a: Double, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> BooleanArray.zip(other: Iterable<R>, transform: (a: Boolean, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <R, V> CharArray.zip(other: Iterable<R>, transform: (a: Char, b: R) -> V): List<V> {\n   val arraySize = size\n   val list = ArrayList<V>(minOf(other.collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in other) {\n   if (i >= arraySize) break\n   list.add(transform(this[i++], element))\n   }\n   return list\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun ByteArray.zip(other: ByteArray): List<Pair<Byte, Byte>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun ShortArray.zip(other: ShortArray): List<Pair<Short, Short>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun IntArray.zip(other: IntArray): List<Pair<Int, Int>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun LongArray.zip(other: LongArray): List<Pair<Long, Long>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun FloatArray.zip(other: FloatArray): List<Pair<Float, Float>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun DoubleArray.zip(other: DoubleArray): List<Pair<Double, Double>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun BooleanArray.zip(other: BooleanArray): List<Pair<Boolean, Boolean>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun CharArray.zip(other: CharArray): List<Pair<Char, Char>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> ByteArray.zip(other: ByteArray, transform: (a: Byte, b: Byte) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> ShortArray.zip(other: ShortArray, transform: (a: Short, b: Short) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list =

ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> IntArray.zip(other: IntArray, transform: (a: Int, b: Int) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> LongArray.zip(other: LongArray, transform: (a: Long, b: Long) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> FloatArray.zip(other: FloatArray, transform: (a: Float, b: Float) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> DoubleArray.zip(other: DoubleArray, transform: (a: Double, b: Double) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> BooleanArray.zip(other: BooleanArray, transform: (a: Boolean, b: Boolean) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <V> CharArray.zip(other: CharArray, transform: (a: Char, b: Char) -> V): List<V> {\n   val size = minOf(size, other.size)\n   val list = ArrayList<V>(size)\n   for (i in 0 until size) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <T, A : Appendable> Array<out T>.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   buffer.appendElement(element, transform)\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> ByteArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Byte) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n   buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> ShortArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix:

CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Short) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> IntArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Int) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> LongArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Long) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> FloatArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Float) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> DoubleArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Double) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which

defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> BooleanArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Boolean) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n   buffer.append(transform(element))\n   else\n   buffer.append(element.toString())\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <A : Appendable> CharArray.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Char) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   if (transform != null)\n   buffer.append(transform(element))\n   else\n   buffer.append(element)\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun <T> Array<out T>.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun ByteArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Byte) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun ShortArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Short) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun IntArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Int) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample

samples.collections.Collections.Transformations.joinToString\n */\npublic fun LongArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Long) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun FloatArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Float) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun DoubleArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Double) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun BooleanArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Boolean) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun CharArray.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((Char) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun <T> Array<out T>.asIterable(): Iterable<T> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun ByteArray.asIterable(): Iterable<Byte> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun ShortArray.asIterable(): Iterable<Short> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun IntArray.asIterable(): Iterable<Int> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun LongArray.asIterable(): Iterable<Long> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun FloatArray.asIterable(): Iterable<Float> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n */\npublic fun DoubleArray.asIterable(): Iterable<Double> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when

being iterated.\n *\npublic fun BooleanArray.asIterable(): Iterable<Boolean> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original array returning its elements when being iterated.\n *\npublic fun CharArray.asIterable(): Iterable<Char> {\n   if (isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun <T> Array<out T>.asSequence(): Sequence<T> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun ByteArray.asSequence(): Sequence<Byte> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun ShortArray.asSequence(): Sequence<Short> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun IntArray.asSequence(): Sequence<Int> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun LongArray.asSequence(): Sequence<Long> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun FloatArray.asSequence(): Sequence<Float> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun DoubleArray.asSequence(): Sequence<Double> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun BooleanArray.asSequence(): Sequence<Boolean> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original array returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromArray\n *\npublic fun CharArray.asSequence(): Sequence<Char> {\n   if (isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfByte\")\npublic fun Array<out Byte>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfShort\")\npublic fun Array<out Short>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfInt\")\npublic fun Array<out Int>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfLong\")\npublic fun Array<out Long>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfFloat\")\npublic fun Array<out Float>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n *\n@kotlin.jvm.JvmName(\"averageOfDouble\")\npublic fun Array<out Double>.average(): Double {\n

var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun ByteArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun ShortArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun IntArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun LongArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun FloatArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the array.\n */\npublic fun DoubleArray.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfByte\")\npublic fun Array<out Byte>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfShort\")\npublic fun Array<out Short>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfInt\")\npublic fun Array<out Int>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfLong\")\npublic fun Array<out Long>.sum(): Long {\n   var sum: Long = 0L\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfFloat\")\npublic fun Array<out Float>.sum(): Float {\n   var sum: Float = 0.0f\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\n@kotlin.jvm.JvmName(\"sumOfDouble\")\npublic fun Array<out Double>.sum(): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun ByteArray.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun ShortArray.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun IntArray.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun LongArray.sum(): Long {\n   var sum: Long = 0L\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun FloatArray.sum(): Float {\n   var sum: Float = 0.0f\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the array.\n */\npublic fun DoubleArray.sum(): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"RangesKt\")\n\npackage kotlin.ranges\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"intRangeContains\")\npublic operator fun ClosedRange<Int>.contains(value: Byte): Boolean {\n   return contains(value.toInt())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"longRangeContains\")\npublic operator fun ClosedRange<Long>.contains(value:

Byte): Boolean {\n   return contains(value.toLong())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"shortRangeContains\")\npublic operator fun ClosedRange<Short>.contains(value: Byte): Boolean {\n   return contains(value.toShort())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"doubleRangeContains\")\npublic operator fun ClosedRange<Double>.contains(value: Byte): Boolean {\n   return contains(value.toDouble())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"floatRangeContains\")\npublic operator fun ClosedRange<Float>.contains(value: Byte): Boolean {\n   return contains(value.toFloat())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"intRangeContains\")\npublic operator fun ClosedRange<Int>.contains(value: Double): Boolean {\n   return value.toIntExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"longRangeContains\")\npublic operator fun ClosedRange<Long>.contains(value: Double): Boolean {\n   return value.toLongExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"byteRangeContains\")\npublic operator fun ClosedRange<Byte>.contains(value: Double): Boolean {\n   return value.toByteExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"shortRangeContains\")\npublic operator fun ClosedRange<Short>.contains(value: Double): Boolean {\n   return value.toShortExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"floatRangeContains\")\npublic operator fun ClosedRange<Float>.contains(value: Double): Boolean {\n   return contains(value.toFloat())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"intRangeContains\")\npublic operator fun ClosedRange<Int>.contains(value: Float): Boolean {\n   return value.toIntExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"longRangeContains\")\npublic operator fun ClosedRange<Long>.contains(value: Float): Boolean {\n   return value.toLongExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"byteRangeContains\")\npublic operator fun ClosedRange<Byte>.contains(value: Float): Boolean {\n   return value.toByteExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"shortRangeContains\")\npublic operator fun ClosedRange<Short>.contains(value: Float): Boolean {\n   return value.toShortExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"doubleRangeContains\")\npublic operator fun ClosedRange<Double>.contains(value: Float): Boolean {\n   return contains(value.toDouble())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"longRangeContains\")\npublic operator fun ClosedRange<Long>.contains(value: Int): Boolean {\n   return contains(value.toLong())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"byteRangeContains\")\npublic operator fun ClosedRange<Byte>.contains(value: Int): Boolean {\n   return value.toByteExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"shortRangeContains\")\npublic operator fun ClosedRange<Short>.contains(value: Int): Boolean {\n   return value.toShortExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"doubleRangeContains\")\npublic operator fun ClosedRange<Double>.contains(value: Int): Boolean {\n   return contains(value.toDouble())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"floatRangeContains\")\npublic operator fun ClosedRange<Float>.contains(value: Int): Boolean {\n   return contains(value.toFloat())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"intRangeContains\")\npublic operator fun ClosedRange<Int>.contains(value: Long): Boolean {\n   return value.toIntExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"byteRangeContains\")\npublic operator fun ClosedRange<Byte>.contains(value: Long): Boolean {\n   return value.toByteExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n *

Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"shortRangeContains\")\npublic operator fun ClosedRange<Short>.contains(value: Long): Boolean {\n   return value.toShortExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"doubleRangeContains\")\npublic operator fun ClosedRange<Double>.contains(value: Long): Boolean {\n   return contains(value.toDouble())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"floatRangeContains\")\npublic operator fun ClosedRange<Float>.contains(value: Long): Boolean {\n   return contains(value.toFloat())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"intRangeContains\")\npublic operator fun ClosedRange<Int>.contains(value: Short): Boolean {\n   return contains(value.toInt())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"longRangeContains\")\npublic operator fun ClosedRange<Long>.contains(value: Short): Boolean {\n   return contains(value.toLong())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"byteRangeContains\")\npublic operator fun ClosedRange<Byte>.contains(value: Short): Boolean {\n   return value.toByteExactOrNull().let { if (it != null) contains(it) else false }\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"doubleRangeContains\")\npublic operator fun ClosedRange<Double>.contains(value: Short): Boolean {\n   return contains(value.toDouble())\n}\n\n/**\n * Checks if the specified [value] belongs to this range.\n */\n@kotlin.jvm.JvmName(\"floatRangeContains\")\npublic operator fun ClosedRange<Float>.contains(value: Short): Boolean {\n   return contains(value.toFloat())\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Int.downTo(to: Byte): IntProgression {\n   return IntProgression.fromClosedRange(this, to.toInt(), -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Long.downTo(to: Byte): LongProgression {\n   return LongProgression.fromClosedRange(this, to.toLong(), -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Byte.downTo(to: Byte): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to.toInt(), -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Short.downTo(to: Byte): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to.toInt(), -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Char.downTo(to: Char): CharProgression {\n   return CharProgression.fromClosedRange(this, to, -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Int.downTo(to: Int): IntProgression {\n   return IntProgression.fromClosedRange(this, to, -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Long.downTo(to: Int): LongProgression {\n   return LongProgression.fromClosedRange(this, to.toLong(), -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Byte.downTo(to: Int): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to, -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Short.downTo(to: Int): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to, -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Int.downTo(to: Long): LongProgression {\n   return LongProgression.fromClosedRange(this.toLong(), to, -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Long.downTo(to: Long): LongProgression {\n   return LongProgression.fromClosedRange(this, to, -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Byte.downTo(to: Long): LongProgression {\n

return LongProgression.fromClosedRange(this.toLong(), to, -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Short.downTo(to: Long): LongProgression {\n   return LongProgression.fromClosedRange(this.toLong(), to, -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Int.downTo(to: Short): IntProgression {\n   return IntProgression.fromClosedRange(this, to.toInt(), -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Long.downTo(to: Short): LongProgression {\n   return LongProgression.fromClosedRange(this, to.toLong(), -1L)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Byte.downTo(to: Short): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to.toInt(), -1)\n}\n\n/**\n * Returns a progression from this value down to the specified [to] value with the step -1.\n * \n * The [to] value has to be less than this value.\n */\npublic infix fun Short.downTo(to: Short): IntProgression {\n   return IntProgression.fromClosedRange(this.toInt(), to.toInt(), -1)\n}\n\n/**\n * Returns a progression that goes over the same range in the opposite direction with the same step.\n */\npublic fun IntProgression.reversed(): IntProgression {\n   return IntProgression.fromClosedRange(last, first, -step)\n}\n\n/**\n * Returns a progression that goes over the same range in the opposite direction with the same step.\n */\npublic fun LongProgression.reversed(): LongProgression {\n   return LongProgression.fromClosedRange(last, first, -step)\n}\n\n/**\n * Returns a progression that goes over the same range in the opposite direction with the same step.\n */\npublic fun CharProgression.reversed(): CharProgression {\n   return CharProgression.fromClosedRange(last, first, -step)\n}\n\n/**\n * Returns a progression that goes over the same range with the given step.\n */\npublic infix fun IntProgression.step(step: Int): IntProgression {\n   checkStepIsPositive(step > 0, step)\n   return IntProgression.fromClosedRange(first, last, if (this.step > 0) step else -step)\n}\n\n/**\n * Returns a progression that goes over the same range with the given step.\n */\npublic infix fun LongProgression.step(step: Long): LongProgression {\n   checkStepIsPositive(step > 0, step)\n   return LongProgression.fromClosedRange(first, last, if (this.step > 0) step else -step)\n}\n\n/**\n * Returns a progression that goes over the same range with the given step.\n */\npublic infix fun CharProgression.step(step: Int): CharProgression {\n   checkStepIsPositive(step > 0, step)\n   return CharProgression.fromClosedRange(first, last, if (this.step > 0) step else -step)\n}\n\ninternal fun Int.toByteExactOrNull(): Byte? {\n   return if (this in Byte.MIN_VALUE.toInt()..Byte.MAX_VALUE.toInt()) this.toByte() else null\n}\n\ninternal fun Long.toByteExactOrNull(): Byte? {\n   return if (this in Byte.MIN_VALUE.toLong()..Byte.MAX_VALUE.toLong()) this.toByte() else null\n}\n\ninternal fun Short.toByteExactOrNull(): Byte? {\n   return if (this in Byte.MIN_VALUE.toShort()..Byte.MAX_VALUE.toShort()) this.toByte() else null\n}\n\ninternal fun Double.toByteExactOrNull(): Byte? {\n   return if (this in Byte.MIN_VALUE.toDouble()..Byte.MAX_VALUE.toDouble()) this.toByte() else null\n}\n\ninternal fun Float.toByteExactOrNull(): Byte? {\n   return if (this in Byte.MIN_VALUE.toFloat()..Byte.MAX_VALUE.toFloat()) this.toByte() else null\n}\n\ninternal fun Long.toIntExactOrNull(): Int? {\n   return if (this in Int.MIN_VALUE.toLong()..Int.MAX_VALUE.toLong()) this.toInt() else null\n}\n\ninternal fun Double.toIntExactOrNull(): Int? {\n   return if (this in Int.MIN_VALUE.toDouble()..Int.MAX_VALUE.toDouble()) this.toInt() else null\n}\n\ninternal fun Float.toIntExactOrNull(): Int? {\n   return if (this in Int.MIN_VALUE.toFloat()..Int.MAX_VALUE.toFloat()) this.toInt() else null\n}\n\ninternal fun Double.toLongExactOrNull(): Long? {\n   return if (this in Long.MIN_VALUE.toDouble()..Long.MAX_VALUE.toDouble()) this.toLong() else null\n}\n\ninternal fun Float.toLongExactOrNull(): Long? {\n   return if (this in Long.MIN_VALUE.toFloat()..Long.MAX_VALUE.toFloat()) this.toLong() else null\n}\n\ninternal fun Int.toShortExactOrNull(): Short? {\n   return if (this in Short.MIN_VALUE.toInt()..Short.MAX_VALUE.toInt()) this.toShort() else null\n}\n\ninternal fun Long.toShortExactOrNull(): Short? {\n   return if (this in

Short.MIN_VALUE.toLong()..Short.MAX_VALUE.toLong()) this.toShort() else null\n}\n\ninternal fun Double.toShortExactOrNull(): Short? {\n   return if (this in Short.MIN_VALUE.toDouble()..Short.MAX_VALUE.toDouble()) this.toShort() else null\n}\n\ninternal fun Float.toShortExactOrNull(): Short? {\n   return if (this in Short.MIN_VALUE.toFloat()..Short.MAX_VALUE.toFloat()) this.toShort() else null\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Int.until(to: Byte): IntRange {\n   return this .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Long.until(to: Byte): LongRange {\n   return this .. (to.toLong() - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Byte.until(to: Byte): IntRange {\n   return this.toInt() .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Short.until(to: Byte): IntRange {\n   return this.toInt() .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to `\\u0000` the returned range is empty.\n */\npublic infix fun Char.until(to: Char): CharRange {\n   if (to <= '\\u0000') return CharRange.EMPTY\n   return this .. (to - 1).toChar()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Int.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Int.until(to: Int): IntRange {\n   if (to <= Int.MIN_VALUE) return IntRange.EMPTY\n   return this .. (to - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Long.until(to: Int): LongRange {\n   return this .. (to.toLong() - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Int.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Byte.until(to: Int): IntRange {\n   if (to <= Int.MIN_VALUE) return IntRange.EMPTY\n   return this.toInt() .. (to - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Int.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Short.until(to: Int): IntRange {\n   if (to <= Int.MIN_VALUE) return IntRange.EMPTY\n   return this.toInt() .. (to - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Long.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Int.until(to: Long): LongRange {\n   if (to <= Long.MIN_VALUE) return LongRange.EMPTY\n   return this.toLong() .. (to - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Long.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Long.until(to: Long): LongRange {\n   if (to <= Long.MIN_VALUE) return LongRange.EMPTY\n   return this .. (to - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Long.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Byte.until(to: Long): LongRange {\n   if (to <= Long.MIN_VALUE) return LongRange.EMPTY\n   return this.toLong() .. (to - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n * \n * If the [to] value is less than or equal to [Long.MIN_VALUE] the returned range is empty.\n */\npublic infix fun Short.until(to: Long): LongRange {\n   if (to <= Long.MIN_VALUE) return LongRange.EMPTY\n   return this.toLong() .. (to - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Int.until(to: Short): IntRange {\n   return this .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Long.until(to: Short): LongRange {\n   return this .. (to.toLong() - 1).toLong()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Byte.until(to: Short): IntRange {\n   return this.toInt() .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Returns a range from this value up to but excluding the specified [to] value.\n */\npublic infix fun Short.until(to: Short): IntRange {\n   return this.toInt() .. (to.toInt() - 1).toInt()\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeastComparable\n */\npublic fun <T: Comparable<T>> T.coerceAtLeast(minimumValue: T): T {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n

* Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Byte.coerceAtLeast(minimumValue: Byte): Byte {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Short.coerceAtLeast(minimumValue: Short): Short {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Int.coerceAtLeast(minimumValue: Int): Int {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Long.coerceAtLeast(minimumValue: Long): Long {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Float.coerceAtLeast(minimumValue: Float): Float {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not less than the specified [minimumValue].\n * \n * @return this value if it's greater than or equal to the [minimumValue] or the [minimumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtLeast\n */\npublic fun Double.coerceAtLeast(minimumValue: Double): Double {\n   return if (this < minimumValue) minimumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMostComparable\n */\npublic fun <T: Comparable<T>> T.coerceAtMost(maximumValue: T): T {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Byte.coerceAtMost(maximumValue: Byte): Byte {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Short.coerceAtMost(maximumValue: Short): Short {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Int.coerceAtMost(maximumValue: Int): Int {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Long.coerceAtMost(maximumValue: Long): Long {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Float.coerceAtMost(maximumValue: Float): Float {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this value is not greater than the specified [maximumValue].\n * \n * @return this value if it's less than or equal to the [maximumValue] or the [maximumValue] otherwise.\n * @sample samples.comparisons.ComparableOps.coerceAtMost\n */\npublic fun Double.coerceAtMost(maximumValue: Double): Double {\n   return if (this > maximumValue) maximumValue else this\n}\n\n/**\n * Ensures that this

value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceInComparable\n */\npublic fun <T: Comparable<T>> T.coerceIn(minimumValue: T?, maximumValue: T?): T {\n   if (minimumValue !== null && maximumValue !== null) {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   }\n   else {\n   if (minimumValue !== null && this < minimumValue) return minimumValue\n   if (maximumValue !== null && this > maximumValue) return maximumValue\n   }\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Byte.coerceIn(minimumValue: Byte, maximumValue: Byte): Byte {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Short.coerceIn(minimumValue: Short, maximumValue: Short): Short {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Int.coerceIn(minimumValue: Int, maximumValue: Int): Int {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Long.coerceIn(minimumValue: Long, maximumValue: Long): Long {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Float.coerceIn(minimumValue: Float, maximumValue: Float): Float {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified range [minimumValue]..[maximumValue].\n * \n * @return this value if it's in the range, or [minimumValue] if this value is less than [minimumValue], or [maximumValue] if this value is greater than [maximumValue].\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Double.coerceIn(minimumValue: Double, maximumValue: Double): Double {\n   if (minimumValue > maximumValue) throw IllegalArgumentException(\"Cannot coerce value to an empty range: maximum $maximumValue is less than

minimum $minimumValue.\")\n   if (this < minimumValue) return minimumValue\n   if (this > maximumValue) return maximumValue\n   return this\n}\n\n/**\n * Ensures that this value lies in the specified [range].\n * \n * @return this value if it's in the [range], or `range.start` if this value is less than `range.start`, or `range.endInclusive` if this value is greater than `range.endInclusive`.\n * @sample samples.comparisons.ComparableOps.coerceInFloatingPointRange\n */\n@SinceKotlin(\"1.1\")\npublic fun <T: Comparable<T>> T.coerceIn(range: ClosedFloatingPointRange<T>): T {\n   if (range.isEmpty()) throw IllegalArgumentException(\"Cannot coerce value to an empty range: $range.\")\n   return when {\n   // this < start equiv to this <= start && !(this >= start)\n   range.lessThanOrEquals(this, range.start) && !range.lessThanOrEquals(range.start, this) -> range.start\n   // this > end equiv to this >= end && !(this <= end)\n   range.lessThanOrEquals(range.endInclusive, this) && !range.lessThanOrEquals(this, range.endInclusive) -> range.endInclusive\n   else -> this\n   }\n}\n\n/**\n * Ensures that this value lies in the specified [range].\n * \n * @return this value if it's in the [range], or `range.start` if this value is less than `range.start`, or `range.endInclusive` if this value is greater than `range.endInclusive`.\n * @sample samples.comparisons.ComparableOps.coerceInComparable\n */\npublic fun <T: Comparable<T>> T.coerceIn(range: ClosedRange<T>): T {\n   if (range is ClosedFloatingPointRange) {\n   return this.coerceIn<T>(range)\n   }\n   if (range.isEmpty()) throw IllegalArgumentException(\"Cannot coerce value to an empty range: $range.\")\n   return when {\n   this < range.start -> range.start\n   this > range.endInclusive -> range.endInclusive\n   else -> this\n   }\n}\n\n/**\n * Ensures that this value lies in the specified [range].\n * \n * @return this value if it's in the [range], or `range.start` if this value is less than `range.start`, or `range.endInclusive` if this value is greater than `range.endInclusive`.\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Int.coerceIn(range: ClosedRange<Int>): Int {\n   if (range is ClosedFloatingPointRange) {\n   return this.coerceIn<Int>(range)\n   }\n   if (range.isEmpty()) throw IllegalArgumentException(\"Cannot coerce value to an empty range: $range.\")\n   return when {\n   this < range.start -> range.start\n   this > range.endInclusive -> range.endInclusive\n   else -> this\n   }\n}\n\n/**\n * Ensures that this value lies in the specified [range].\n * \n * @return this value if it's in the [range], or `range.start` if this value is less than `range.start`, or `range.endInclusive` if this value is greater than `range.endInclusive`.\n * @sample samples.comparisons.ComparableOps.coerceIn\n */\npublic fun Long.coerceIn(range: ClosedRange<Long>): Long {\n   if (range is ClosedFloatingPointRange) {\n   return this.coerceIn<Long>(range)\n   }\n   if (range.isEmpty()) throw IllegalArgumentException(\"Cannot coerce value to an empty range: $range.\")\n   return when {\n   this < range.start -> range.start\n   this > range.endInclusive -> range.endInclusive\n   else -> this\n   }\n}\n\n","/*\n * Copyright 2010-2018 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// Auto-generated file. DO NOT EDIT!\n\npackage kotlin.ranges\n\n/**\n * A range of values of type `Char`.\n */\npublic class CharRange(start: Char, endInclusive: Char) : CharProgression(start, endInclusive, 1), ClosedRange<Char> {\n   override val start: Char get() = first\n   override val endInclusive: Char get() = last\n\n   override fun contains(value: Char): Boolean = first <= value && value <= last\n\n   override fun isEmpty(): Boolean = first > last\n\n   override fun equals(other: Any?): Boolean =\n   other is CharRange && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * first.toInt() + last.toInt())\n\n   override fun toString(): String = \"$first..$last\"\n\n   companion object {\n   /** An empty range of values of type Char. */\n   public val EMPTY: CharRange = CharRange(1.toChar(), 0.toChar())\n   }\n}\n\n/**\n * A range of values of type `Int`.\n */\npublic class IntRange(start: Int, endInclusive: Int) : IntProgression(start, endInclusive, 1), ClosedRange<Int> {\n   override val start: Int get() = first\n   override val endInclusive: Int get() = last\n\n   override fun contains(value: Int): Boolean = first <= value && value <= last\n\n   override fun isEmpty(): Boolean = first > last\n\n   override fun equals(other:

Any?): Boolean =\n   other is IntRange && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * first + last)\n\n   override fun toString(): String = \"$first..$last\"\n\n   companion object {\n   /** An empty range of values of type Int. */\n   public val EMPTY: IntRange = IntRange(1, 0)\n   }\n}\n\n/**\n * A range of values of type `Long`.\n */\npublic class LongRange(start: Long, endInclusive: Long) : LongProgression(start, endInclusive, 1), ClosedRange<Long> {\n   override val start: Long get() = first\n   override val endInclusive: Long get() = last\n\n   override fun contains(value: Long): Boolean = first <= value && value <= last\n\n   override fun isEmpty(): Boolean = first > last\n\n   override fun equals(other: Any?): Boolean =\n   other is LongRange && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * (first xor (first ushr 32)) + (last xor (last ushr 32))).toInt()\n\n   override fun toString(): String = \"$first..$last\"\n\n   companion object {\n   /** An empty range of values of type Long. */\n   public val EMPTY: LongRange = LongRange(1, 0)\n   }\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\n\npackage kotlin.collections\n\nimport kotlin.comparisons.compareValues\n\ninternal object EmptyIterator : ListIterator<Nothing> {\n   override fun hasNext(): Boolean = false\n   override fun hasPrevious(): Boolean = false\n   override fun nextIndex(): Int = 0\n   override fun previousIndex(): Int = -1\n   override fun next(): Nothing = throw NoSuchElementException()\n   override fun previous(): Nothing = throw NoSuchElementException()\n}\n\ninternal object EmptyList : List<Nothing>, Serializable, RandomAccess {\n   private const val serialVersionUID: Long = -7390468764508069838L\n\n   override fun equals(other: Any?): Boolean = other is List<*> && other.isEmpty()\n   override fun hashCode(): Int = 1\n   override fun toString(): String = \"[]\"\n\n   override val size: Int get() = 0\n   override fun isEmpty(): Boolean = true\n   override fun contains(element: Nothing): Boolean = false\n   override fun containsAll(elements: Collection<Nothing>): Boolean = elements.isEmpty()\n\n   override fun get(index: Int): Nothing = throw IndexOutOfBoundsException(\"Empty list doesn't contain element at index $index.\")\n   override fun indexOf(element: Nothing): Int = -1\n   override fun lastIndexOf(element: Nothing): Int = -1\n\n   override fun iterator(): Iterator<Nothing> = EmptyIterator\n   override fun listIterator(): ListIterator<Nothing> = EmptyIterator\n   override fun listIterator(index: Int): ListIterator<Nothing> {\n   if (index != 0) throw IndexOutOfBoundsException(\"Index: $index\")\n   return EmptyIterator\n   }\n\n   override fun subList(fromIndex: Int, toIndex: Int): List<Nothing> {\n   if (fromIndex == 0 && toIndex == 0) return this\n   throw IndexOutOfBoundsException(\"fromIndex: $fromIndex, toIndex: $toIndex\")\n   }\n\n   private fun readResolve(): Any = EmptyList\n}\n\ninternal fun <T> Array<out T>.asCollection(): Collection<T> = ArrayAsCollection(this, isVarargs = false)\n\nprivate class ArrayAsCollection<T>(val values: Array<out T>, val isVarargs: Boolean): Collection<T> {\n   override val size: Int get() = values.size\n   override fun isEmpty(): Boolean = values.isEmpty()\n   override fun contains(element: T): Boolean = values.contains(element)\n   override fun containsAll(elements: Collection<T>): Boolean = elements.all { contains(it) }\n   override fun iterator(): Iterator<T> = values.iterator()\n   // override hidden toArray implementation to prevent copying of values array\n   public fun toArray(): Array<out Any?> = values.copyToArrayOfAny(isVarargs)\n}\n\n/**\n * Returns an empty read-only list. The returned list is serializable (JVM).\n * @sample samples.collections.Collections.Lists.emptyReadOnlyList\n */\npublic fun <T> emptyList(): List<T> = EmptyList\n\n/**\n * Returns a new read-only list of given elements. The returned list is serializable (JVM).\n * @sample samples.collections.Collections.Lists.readOnlyList\n */\npublic fun <T> listOf(vararg elements: T): List<T> = if (elements.size > 0) elements.asList() else emptyList()\n\n/**\n * Returns an empty read-only list. The returned list is serializable (JVM).\n * @sample

samples.collections.Collections.Lists.emptyReadOnlyList\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> listOf(): List<T> = emptyList()\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n/**\n * Returns an empty new [MutableList].\n * @sample samples.collections.Collections.Lists.emptyMutableList\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> mutableListOf(): MutableList<T> = ArrayList()\n\n/**\n * Returns an empty new [ArrayList].\n * @sample samples.collections.Collections.Lists.emptyArrayList\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> arrayListOf(): ArrayList<T> = ArrayList()\n\n/**\n * Returns a new [MutableList] with the given elements.\n * @sample samples.collections.Collections.Lists.mutableList\n *\npublic fun <T> mutableListOf(vararg elements: T): MutableList<T>\n   = if (elements.size == 0) ArrayList() else ArrayList(ArrayAsCollection(elements, isVarargs = true))\n\n/**\n * Returns a new [ArrayList] with the given elements.\n * @sample samples.collections.Collections.Lists.arrayList\n *\npublic fun <T> arrayListOf(vararg elements: T): ArrayList<T>\n   = if (elements.size == 0) ArrayList() else ArrayList(ArrayAsCollection(elements, isVarargs = true))\n\n/**\n * Returns a new read-only list either of single given element, if it is not null, or empty list if the element is null. The returned list is serializable (JVM).\n * @sample samples.collections.Collections.Lists.listOfNotNull\n *\npublic fun <T : Any> listOfNotNull(element: T?): List<T> = if (element != null) listOf(element) else emptyList()\n\n/**\n * Returns a new read-only list only of those given elements, that are not null. The returned list is serializable (JVM).\n * @sample samples.collections.Collections.Lists.listOfNotNull\n *\npublic fun <T : Any> listOfNotNull(vararg elements: T?): List<T> = elements.filterNotNull()\n\n/**\n * Creates a new read-only list with the specified [size], where each element is calculated by calling the specified\n * [init] function. The [init] function returns a list element given its index.\n * @sample samples.collections.Collections.Lists.readOnlyListFromInitializer\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> List(size: Int, init: (index: Int) -> T): List<T> = MutableList(size, init)\n\n/**\n * Creates a new mutable list with the specified [size], where each element is calculated by calling the specified\n * [init] function. The [init] function returns a list element given its index.\n * @sample samples.collections.Collections.Lists.mutableListFromInitializer\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> MutableList(size: Int, init: (index: Int) -> T): MutableList<T> {\n   val list = ArrayList<T>(size)\n   repeat(size) { index -> list.add(init(index)) }\n return list\n}\n\n/**\n * Returns an [IntRange] of the valid indices for this collection.\n * @sample samples.collections.Collections.Collections.indicesOfCollection\n *\npublic val Collection<*>.indices: IntRange\n get() = 0..size - 1\n\n/**\n * Returns the index of the last item in the list or -1 if the list is empty.\n *\n * @sample samples.collections.Collections.Lists.lastIndexOfList\n *\npublic val <T> List<T>.lastIndex: Int\n   get() = this.size - 1\n\n/**\n * Returns `true` if the collection is not empty.\n * @sample samples.collections.Collections.Collections.collectionIsNotEmpty\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> Collection<T>.isNotEmpty(): Boolean = !isEmpty()\n\n/**\n * Returns this Collection if it's not `null` and the empty list otherwise.\n * @sample samples.collections.Collections.Collections.collectionOrEmpty\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> Collection<T>?.orEmpty(): Collection<T> = this ?: emptyList()\n\n/**\n * Returns this List if it's not `null` and the empty list otherwise.\n * @sample samples.collections.Collections.Lists.listOrEmpty\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>?.orEmpty(): List<T> = this ?: emptyList()\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n/**\n * Checks if all elements in the specified collection are contained in this collection.\n *\n * Allows to overcome type-safety restriction of `containsAll` that requires to pass a collection of type `Collection<E>`.\n * @sample samples.collections.Collections.Collections.collectionContainsAll\n *\n@Suppress(\"EXTENSION_SHADOWED_BY_MEMBER\") // false warning, extension takes precedence in some cases\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes T> Collection<T>.containsAll(elements: Collection<T>): Boolean = this.containsAll(elements)\n\ninternal fun <T> List<T>.optimizeReadOnlyList() = when (size) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this\n}\n\n/* Not available on platform: JS */\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n/* Not available

on platform: JS *\n\n\n\n\n\n\n/**\n * Searches this list or its range for the provided [element] using the binary search algorithm.\n * The list is expected to be sorted into ascending order according to the Comparable natural ordering of its elements,\n * otherwise the result is undefined.\n *\n * If the list contains multiple elements equal to the specified [element], there is no guarantee which one will be found.\n *\n * `null` value is considered to be less than any non-null value.\n *\n * @return the index of the element, if it is contained in the list within the specified range;\n * otherwise, the inverted insertion point `(-insertion point - 1)`.\n * The insertion point is defined as the index at which the element should be inserted,\n * so that the list (or the specified subrange of list) still remains sorted.\n * @sample samples.collections.Collections.Lists.binarySearchOnComparable\n * @sample samples.collections.Collections.Lists.binarySearchWithBoundaries\n */\npublic fun <T: Comparable<T>> List<T?>.binarySearch(element: T?, fromIndex: Int = 0, toIndex: Int = size): Int {\n   rangeCheck(size, fromIndex, toIndex)\n\n   var low = fromIndex\n   var high = toIndex - 1\n\n   while (low <= high) {\n   val mid = (low + high).ushr(1) // safe from overflows\n   val midVal = get(mid)\n   val cmp = compareValues(midVal, element)\n\n   if (cmp < 0)\n   low = mid + 1\n   else if (cmp > 0)\n   high = mid - 1\n   else\n   return mid // key found\n   }\n   return -(low + 1) // key not found\n}\n\n/**\n * Searches this list or its range for the provided [element] using the binary search algorithm.\n * The list is expected to be sorted into ascending order according to the specified [comparator],\n * otherwise the result is undefined.\n *\n * If the list contains multiple elements equal to the specified [element], there is no guarantee which one will be found.\n *\n * `null` value is considered to be less than any non-null value.\n *\n * @return the index of the element, if it is contained in the list within the specified range;\n * otherwise, the inverted insertion point `(-insertion point - 1)`.\n * The insertion point is defined as the index at which the element should be inserted,\n * so that the list (or the specified subrange of list) still remains sorted according to the specified [comparator].\n * @sample samples.collections.Collections.Lists.binarySearchWithComparator\n */\npublic fun <T> List<T>.binarySearch(element: T, comparator: Comparator<in T>, fromIndex: Int = 0, toIndex: Int = size): Int {\n   rangeCheck(size, fromIndex, toIndex)\n\n   var low = fromIndex\n   var high = toIndex - 1\n\n   while (low <= high) {\n   val mid = (low + high).ushr(1) // safe from overflows\n   val midVal = get(mid)\n   val cmp = comparator.compare(midVal, element)\n\n   if (cmp < 0)\n   low = mid + 1\n   else if (cmp > 0)\n   high = mid - 1\n   else\n   return mid // key found\n   }\n   return -(low + 1) // key not found\n}\n\n/**\n * Searches this list or its range for an element having the key returned by the specified [selector] function\n * equal to the provided [key] value using the binary search algorithm.\n * The list is expected to be sorted into ascending order according to the Comparable natural ordering of keys of its elements.\n * otherwise the result is undefined.\n *\n * If the list contains multiple elements with the specified [key], there is no guarantee which one will be found.\n *\n * `null` value is considered to be less than any non-null value.\n *\n * @return the index of the element with the specified [key], if it is contained in the list within the specified range;\n * otherwise, the inverted insertion point `(-insertion point - 1)`.\n * The insertion point is defined as the index at which the element should be inserted,\n * so that the list (or the specified subrange of list) still remains sorted.\n * @sample samples.collections.Collections.Lists.binarySearchByKey\n */\npublic inline fun <T, K : Comparable<K>> List<T>.binarySearchBy(key: K?, fromIndex: Int = 0, toIndex: Int = size, crossinline selector: (T) -> K?): Int =\n binarySearch(fromIndex, toIndex) { compareValues(selector(it), key) }\n\n// do not introduce this overload --- too rare\n//public fun <T, K> List<T>.binarySearchBy(key: K, comparator: Comparator<K>, fromIndex: Int = 0, toIndex: Int = size(), selector: (T) -> K): Int =\n//   binarySearch(fromIndex, toIndex) { comparator.compare(selector(it), key) }\n\n/**\n * Searches this list or its range for an element for which [comparison] function returns zero using the binary search algorithm.\n * The list is expected to be sorted into ascending order according to the provided [comparison],\n * otherwise the result is undefined.\n *\n * If the list contains multiple elements for which [comparison] returns zero, there is no guarantee which one will be found.\n *\n * @param comparison function that compares an element of the list with the element being searched.\n *\n * @return the index of the found element, if it is contained in the list within the specified range;\n * otherwise, the inverted insertion point `(-insertion point - 1)`.\n * The insertion point is defined as the index at which the element should be inserted,\n * so that the list (or the specified subrange of list) still remains sorted.\n * @sample

samples.collections.Collections.Lists.binarySearchWithComparisonFunction\n */\npublic fun <T> List<T>.binarySearch(fromIndex: Int = 0, toIndex: Int = size, comparison: (T) -> Int): Int {\n   rangeCheck(size, fromIndex, toIndex)\n\n   var low = fromIndex\n   var high = toIndex - 1\n\n   while (low <= high) {\n   val mid = (low + high).ushr(1) // safe from overflows\n   val midVal = get(mid)\n   val cmp = comparison(midVal)\n\n   if (cmp < 0)\n   low = mid + 1\n   else if (cmp > 0)\n   high = mid - 1\n   else\n   return mid // key found\n   }\n   return -(low + 1) // key not found\n}\n\n/**\n * Checks that `from` and `to` are in\n * the range of [0..size] and throws an appropriate exception, if they aren't.\n */\nprivate fun rangeCheck(size: Int, fromIndex: Int, toIndex: Int) {\n   when {\n   fromIndex > toIndex -> throw IllegalArgumentException(\"fromIndex ($fromIndex) is greater than toIndex ($toIndex).\")\n   fromIndex < 0 -> throw IndexOutOfBoundsException(\"fromIndex ($fromIndex) is less than zero.\")\n   toIndex > size -> throw IndexOutOfBoundsException(\"toIndex ($toIndex) is greater than size ($size).\")\n   }\n}\n\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"MapsKt\")\n\npackage kotlin.collections\n\nprivate object EmptyMap : Map<Any?, Nothing>, Serializable {\n   private const val serialVersionUID: Long = 8246714829545688274\n\n   override fun equals(other: Any?): Boolean = other is Map<*,*> && other.isEmpty()\n   override fun hashCode(): Int = 0\n   override fun toString(): String = \"{}\"\n\n   override val size: Int get() = 0\n   override fun isEmpty(): Boolean = true\n\n   override fun containsKey(key: Any?): Boolean = false\n   override fun containsValue(value: Nothing): Boolean = false\n   override fun get(key: Any?): Nothing? = null\n   override val entries: Set<Map.Entry<Any?, Nothing>> get() = EmptySet\n   override val keys: Set<Any?> get() = EmptySet\n   override val values: Collection<Nothing> get() = EmptyList\n\n   private fun readResolve(): Any = EmptyMap\n}\n\n/**\n * Returns an empty read-only map of specified type.\n *\n * The returned map is serializable (JVM).\n * @sample samples.collections.Maps.Instantiation.emptyReadOnlyMap\n */\npublic fun <K, V> emptyMap(): Map<K, V> = @Suppress(\"UNCHECKED_CAST\") (EmptyMap as Map<K, V>)\n\n/**\n * Returns a new read-only map with the specified contents, given as a list of pairs\n * where the first value is the key and the second is the value.\n *\n * If multiple pairs have the same key, the resulting map will contain the value from the last of those pairs.\n *\n * Entries of the map are iterated in the order they were specified.\n *\n * The returned map is serializable (JVM).\n *\n * @sample samples.collections.Maps.Instantiation.mapFromPairs\n */\npublic fun <K, V> mapOf(vararg pairs: Pair<K, V>): Map<K, V> = if (pairs.size > 0) pairs.toMap(LinkedHashMap(mapCapacity(pairs.size))) else emptyMap()\n\n/**\n * Returns an empty read-only map.\n *\n * The returned map is serializable (JVM).\n * @sample samples.collections.Maps.Instantiation.emptyReadOnlyMap\n */\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> mapOf(): Map<K, V> = emptyMap()\n\n/* Not available on platform: JS */\n\n\n\n\n/**\n * Returns an empty new [MutableMap].\n *\n * The returned map preserves the entry iteration order.\n * @sample samples.collections.Maps.Instantiation.emptyMutableMap\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> mutableMapOf(): MutableMap<K, V> = LinkedHashMap()\n\n/**\n * Returns a new [MutableMap] with the specified contents, given as a list of pairs\n * where the first component is the key and the second is the value.\n *\n * If multiple pairs have the same key, the resulting map will contain the value from the last of those pairs.\n *\n * Entries of the map are iterated in the order they were specified.\n *\n * @sample samples.collections.Maps.Instantiation.mutableMapFromPairs\n * @sample samples.collections.Maps.Instantiation.emptyMutableMap\n */\npublic fun <K, V> mutableMapOf(vararg pairs: Pair<K, V>): MutableMap<K, V>\n   = LinkedHashMap<K, V>(mapCapacity(pairs.size)).apply { putAll(pairs) }\n\n/**\n * Returns an empty new [HashMap].\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> hashMapOf(): HashMap<K, V> = HashMap<K, V>()\n\n/**\n * Returns a new [HashMap] with the specified contents, given as a list of pairs\n * where the first component is the key and the second is the value.\n *\n * @sample samples.collections.Maps.Instantiation.hashMapFromPairs\n */\npublic fun <K, V> hashMapOf(vararg pairs: Pair<K, V>): HashMap<K, V>\n   = HashMap<K, V>(mapCapacity(pairs.size)).apply { putAll(pairs) }\n\n/**\n * Returns an empty new [LinkedHashMap].\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> linkedMapOf():

LinkedHashMap<K, V> = LinkedHashMap<K, V>()\n\n/**\n * Returns a new [LinkedHashMap] with the specified contents, given as a list of pairs\n * where the first component is the key and the second is the value.\n *\n * If multiple pairs have the same key, the resulting map will contain the value from the last of those pairs.\n *\n * Entries of the map are iterated in the order they were specified.\n *\n * @sample samples.collections.Maps.Instantiation.linkedMapFromPairs\n */\npublic fun <K, V> linkedMapOf(vararg pairs: Pair<K, V>): LinkedHashMap<K, V>\n   = pairs.toMap(LinkedHashMap(mapCapacity(pairs.size)))\n\n/**\n * Calculate the initial capacity of a map, based on Guava's com.google.common.collect.Maps approach. This is equivalent\n * to the Collection constructor for HashSet, (c.size()/.75f) + 1, but provides further optimisations for very small or\n * very large sizes, allows support non-collection classes, and provides consistency for all map based class construction.\n */\n@PublishedApi\ninternal fun mapCapacity(expectedSize: Int): Int {\n   if (expectedSize < 3) {\n   return expectedSize + 1\n   }\n   if (expectedSize < INT_MAX_POWER_OF_TWO) {\n   return expectedSize + expectedSize / 3\n   }\n   return Int.MAX_VALUE // any large value\n}\n\nprivate const val INT_MAX_POWER_OF_TWO: Int = Int.MAX_VALUE / 2 + 1\n\n/** Returns `true` if this map is not empty. */\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<out K, V>.isNotEmpty(): Boolean = !isEmpty()\n\n/**\n * Returns the [Map] if its not `null`, or the empty [Map] otherwise.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<K, V>?.orEmpty() : Map<K, V> = this ?: emptyMap()\n\n/**\n * Checks if the map contains the given key.\n *\n * This method allows to use the `x in map` syntax for checking whether an object is contained in the map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <@kotlin.internal.OnlyInputTypes K, V> Map<out K, V>.contains(key: K) : Boolean = containsKey(key)\n\n/**\n * Returns the value corresponding to the given [key], or `null` if such a key is not present in the map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <@kotlin.internal.OnlyInputTypes K, V> Map<out K, V>.get(key: K): V?\n   = @Suppress(\"UNCHECKED_CAST\") (this as Map<K, V>).get(key)\n\n/**\n * Allows to use the index operator for storing values in a mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.set(key: K, value: V): Unit {\n   put(key, value)\n}\n\n/**\n * Returns `true` if the map contains the specified [key].\n *\n * Allows to overcome type-safety restriction of `containsKey` that requires to pass a key of type `K`.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes K> Map<out K, *>.containsKey(key: K): Boolean\n   = @Suppress(\"UNCHECKED_CAST\") (this as Map<K, *>).containsKey(key)\n\n/**\n * Returns `true` if the map maps one or more keys to the specified [value].\n *\n * Allows to overcome type-safety restriction of `containsValue` that requires to pass a value of type `V`.\n */\n@Suppress(\"EXTENSION_SHADOWED_BY_MEMBER\") // false warning, extension takes precedence in some cases\n@kotlin.internal.InlineOnly\npublic inline fun <K, @kotlin.internal.OnlyInputTypes V> Map<K, V>.containsValue(value: V): Boolean = this.containsValue(value)\n\n/**\n * Removes the specified key and its corresponding value from this map.\n *\n * @return the previous value associated with the key, or `null` if the key was not present in the map.\n\n * Allows to overcome type-safety restriction of `remove` that requires to pass a key of type `K`.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes K, V> MutableMap<out K, V>.remove(key: K): V?\n   = @Suppress(\"UNCHECKED_CAST\") (this as MutableMap<K, V>).remove(key)\n\n/**\n * Returns the key component of the map entry.\n *\n * This method allows to use destructuring declarations when working with maps, for example:\n * ```\n * for ((key, value) in map) {\n *   // do something with the key and the value\n * }\n * ```\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> Map.Entry<K, V>.component1(): K = key\n\n/**\n * Returns the value component of the map entry.\n *\n * This method allows to use destructuring declarations when working with maps, for example:\n * ```\n * for ((key, value) in map) {\n *   // do something with the key and the value\n * }\n * ```\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> Map.Entry<K, V>.component2(): V = value\n\n/**\n * Converts entry to [Pair] with key being first component and value being second.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map.Entry<K, V>.toPair(): Pair<K, V> = Pair(key, value)\n\n/**\n * Returns the value for the given key, or the result of the [defaultValue] function if there was no entry for the given key.\n *\n * @sample samples.collections.Maps.Usage.getOrElse\n

*/\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<K, V>.getOrElse(key: K, defaultValue: () -> V): V = get(key) ?: defaultValue()\n\n\ninternal inline fun <K, V> Map<K, V>.getOrElseNullable(key: K, defaultValue: () -> V): V {\n   val value = get(key)\n   if (value == null && !containsKey(key)) {\n   return defaultValue()\n   } else {\n   @Suppress(\"UNCHECKED_CAST\")\n   return value as V\n   }\n}\n\n\n/**\n * Returns the value for the given [key] or throws an exception if there is no such key in the map.\n *\n * If the map was created by [withDefault], resorts to its `defaultValue` provider function\n * instead of throwing an exception.\n *\n * @throws NoSuchElementException when the map doesn't contain a value for the specified key and\n * no implicit default value was provided for that map.\n */\n@SinceKotlin(\"1.1\")\npublic fun <K, V> Map<K, V>.getValue(key: K): V = getOrImplicitDefault(key)\n\n/**\n * Returns the value for the given key. If the key is not found in the map, calls the [defaultValue] function,\n * puts its result into the map under the given key and returns it.\n *\n * @sample samples.collections.Maps.Usage.getOrPut\n */\npublic inline fun <K, V> MutableMap<K, V>.getOrPut(key: K, defaultValue: () -> V): V {\n   val value = get(key)\n   return if (value == null) {\n   val answer = defaultValue()\n   put(key, answer)\n   answer\n   } else {\n   value\n   }\n}\n\n/**\n * Returns an [Iterator] over the entries in the [Map].\n *\n * @sample samples.collections.Maps.Usage.forOverEntries\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> Map<out K, V>.iterator(): Iterator<Map.Entry<K, V>> = entries.iterator()\n\n/**\n * Returns a [MutableIterator] over the mutable entries in the [MutableMap].\n *\n */\n@kotlin.jvm.JvmName(\"mutableIterator\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.iterator(): MutableIterator<MutableMap.MutableEntry<K, V>> = entries.iterator()\n\n/**\n * Populates the given [destination] map with entries having the keys of this map and the values obtained\n * by applying the [transform] function to each entry in this [Map].\n */\npublic inline fun <K, V, R, M : MutableMap<in K, in R>> Map<out K, V>.mapValuesTo(destination: M, transform: (Map.Entry<K, V>) -> R): M {\n   return entries.associateByTo(destination, { it.key }, transform)\n}\n\n/**\n * Populates the given [destination] map with entries having the keys obtained\n * by applying the [transform] function to each entry in this [Map] and the values of this map.\n *\n * In case if any two entries are mapped to the equal keys, the value of the latter one will overwrite\n * the value associated with the former one.\n */\npublic inline fun <K, V, R, M : MutableMap<in R, in V>> Map<out K, V>.mapKeysTo(destination: M, transform: (Map.Entry<K, V>) -> R): M {\n   return entries.associateByTo(destination, transform, { it.value })\n}\n\n/**\n * Puts all the given [pairs] into this [MutableMap] with the first component in the pair being the key and the second the value.\n */\npublic fun <K, V> MutableMap<in K, in V>.putAll(pairs: Array<out Pair<K, V>>): Unit {\n   for ((key, value) in pairs) {\n   put(key, value)\n   }\n}\n\n/**\n * Puts all the elements of the given collection into this [MutableMap] with the first\n * component in the pair being the key and the second the value.\n */\npublic fun <K, V> MutableMap<in K, in V>.putAll(pairs: Iterable<Pair<K,V>>): Unit {\n   for ((key, value) in pairs) {\n   put(key, value)\n   }\n}\n\n/**\n * Puts all the elements of the given sequence into this [MutableMap] with the first component in the\n * pair being the key and the second the value.\n */\npublic fun <K, V> MutableMap<in K, in V>.putAll(pairs: Sequence<Pair<K,V>>): Unit {\n   for ((key, value) in pairs) {\n   put(key, value)\n   }\n}\n\n/**\n * Returns a new map with entries having the keys of this map and the values obtained by applying the [transform]\n * function to each entry in this [Map].\n *\n * The returned map preserves the entry iteration order of the original map.\n *\n * @sample samples.collections.Maps.Transformations.mapValues\n */\npublic inline fun <K, V, R> Map<out K, V>.mapValues(transform: (Map.Entry<K, V>) -> R): Map<K, R> {\n   return mapValuesTo(LinkedHashMap<K, R>(mapCapacity(size)), transform) // .optimizeReadOnlyMap()\n}\n\n/**\n * Returns a new Map with entries having the keys obtained by applying the [transform] function to each entry in this\n * [Map] and the values of this map.\n *\n * In case if any two entries are mapped to the equal keys, the value of the latter one will overwrite\n * the value associated with the former one.\n *\n * The returned map preserves the entry iteration order of the original map.\n *\n * @sample samples.collections.Maps.Transformations.mapKeys\n */\npublic inline fun <K, V, R> Map<out K, V>.mapKeys(transform: (Map.Entry<K, V>) -> R): Map<R, V> {\n   return mapKeysTo(LinkedHashMap<R, V>(mapCapacity(size)), transform) // .optimizeReadOnlyMap()\n}\n\n/**\n * Returns a map containing all key-value pairs with keys matching the given [predicate].\n *\n * The returned map preserves the entry iteration order of the original map.\n * @sample samples.collections.Maps.Filtering.filterKeys\n

*/\npublic inline fun <K, V> Map<out K, V>.filterKeys(predicate: (K) -> Boolean): Map<K, V> {\n   val result = LinkedHashMap<K, V>()\n   for (entry in this) {\n   if (predicate(entry.key)) {\n   result.put(entry.key, entry.value)\n   }\n   }\n   return result\n}\n\n/**\n * Returns a map containing all key-value pairs with values matching the given [predicate].\n *\n * The returned map preserves the entry iteration order of the original map.\n * @sample samples.collections.Maps.Filtering.filterValues\n */\npublic inline fun <K, V> Map<out K, V>.filterValues(predicate: (V) -> Boolean): Map<K, V> {\n   val result = LinkedHashMap<K, V>()\n   for (entry in this) {\n   if (predicate(entry.value)) {\n   result.put(entry.key, entry.value)\n   }\n   }\n   return result\n}\n\n/**\n * Appends all entries matching the given [predicate] into the mutable map given as [destination] parameter.\n *\n * @return the destination map.\n * @sample samples.collections.Maps.Filtering.filterTo\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> Map<out K, V>.filterTo(destination: M, predicate: (Map.Entry<K, V>) -> Boolean): M {\n   for (element in this) {\n   if (predicate(element)) {\n   destination.put(element.key, element.value)\n   }\n   }\n   return destination\n}\n\n/**\n * Returns a new map containing all key-value pairs matching the given [predicate].\n *\n * The returned map preserves the entry iteration order of the original map.\n * @sample samples.collections.Maps.Filtering.filter\n */\npublic inline fun <K, V> Map<out K, V>.filter(predicate: (Map.Entry<K, V>) -> Boolean): Map<K, V> {\n   return filterTo(LinkedHashMap<K, V>(), predicate)\n}\n\n/**\n * Appends all entries not matching the given [predicate] into the given [destination].\n *\n * @return the destination map.\n * @sample samples.collections.Maps.Filtering.filterNotTo\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> Map<out K, V>.filterNotTo(destination: M, predicate: (Map.Entry<K, V>) -> Boolean): M {\n   for (element in this) {\n   if (!predicate(element)) {\n   destination.put(element.key, element.value)\n   }\n   }\n   return destination\n}\n\n/**\n * Returns a new map containing all key-value pairs not matching the given [predicate].\n *\n * The returned map preserves the entry iteration order of the original map.\n * @sample samples.collections.Maps.Filtering.filterNot\n */\npublic inline fun <K, V> Map<out K, V>.filterNot(predicate: (Map.Entry<K, V>) -> Boolean): Map<K, V> {\n   return filterNotTo(LinkedHashMap<K, V>(), predicate)\n}\n\n/**\n * Returns a new map containing all key-value pairs from the given collection of pairs.\n *\n * The returned map preserves the entry iteration order of the original collection.\n */\npublic fun <K, V> Iterable<Pair<K, V>>.toMap(): Map<K, V> {\n   if (this is Collection) {\n   return when (size) {\n   0 -> emptyMap()\n   1 -> mapOf(if (this is List) this[0] else iterator().next())\n   else -> toMap(LinkedHashMap<K, V>(mapCapacity(size)))\n   }\n   }\n   return toMap(LinkedHashMap<K, V>()).optimizeReadOnlyMap()\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs from the given collection of pairs.\n */\npublic fun <K, V, M : MutableMap<in K, in V>> Iterable<Pair<K, V>>.toMap(destination: M): M\n   = destination.apply { putAll(this@toMap) }\n\n/**\n * Returns a new map containing all key-value pairs from the given array of pairs.\n *\n * The returned map preserves the entry iteration order of the original array.\n */\npublic fun <K, V> Array<out Pair<K, V>>.toMap(): Map<K, V> = when(size) {\n   0 -> emptyMap()\n   1 -> mapOf(this[0])\n   else -> toMap(LinkedHashMap<K, V>(mapCapacity(size)))\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs from the given array of pairs.\n */\npublic fun <K, V, M : MutableMap<in K, in V>> Array<out Pair<K, V>>.toMap(destination: M): M\n   = destination.apply { putAll(this@toMap) }\n\n/**\n * Returns a new map containing all key-value pairs from the given sequence of pairs.\n *\n * The returned map preserves the entry iteration order of the original sequence.\n */\npublic fun <K, V> Sequence<Pair<K, V>>.toMap(): Map<K, V> = toMap(LinkedHashMap<K, V>()).optimizeReadOnlyMap()\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs from the given sequence of pairs.\n */\npublic fun <K, V, M : MutableMap<in K, in V>> Sequence<Pair<K, V>>.toMap(destination: M): M\n   = destination.apply { putAll(this@toMap) }\n\n/**\n * Returns a new read-only map containing all key-value pairs from the original map.\n *\n * The returned map preserves the entry iteration order of the original map.\n */\n@SinceKotlin(\"1.1\")\npublic fun <K, V> Map<out K, V>.toMap(): Map<K, V> = when (size) {\n   0 -> emptyMap()\n   1 -> toSingletonMap()\n   else -> toMutableMap()\n}\n\n/**\n * Returns a new mutable map containing all key-value pairs from the original map.\n *\n * The returned map preserves the entry iteration order of the original map.\n */\n@SinceKotlin(\"1.1\")\npublic

fun <K, V> Map<out K, V>.toMutableMap(): MutableMap<K, V> = LinkedHashMap(this)\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs from the given map.\n */\n@SinceKotlin(\"1.1\")\npublic fun <K, V, M : MutableMap<in K, in V>> Map<out K, V>.toMap(destination: M): M\n   = destination.apply { putAll(this@toMap) }\n\n/**\n * Creates a new read-only map by replacing or adding an entry to this map from a given key-value [pair].\n *\n * The returned map preserves the entry iteration order of the original map.\n * The [pair] is iterated in the end if it has a unique key.\n */\npublic operator fun <K, V> Map<out K, V>.plus(pair: Pair<K, V>): Map<K, V>\n   = if (this.isEmpty()) mapOf(pair) else LinkedHashMap(this).apply { put(pair.first, pair.second) }\n\n/**\n * Creates a new read-only map by replacing or adding entries to this map from a given collection of key-value [pairs].\n *\n * The returned map preserves the entry iteration order of the original map.\n * Those [pairs] with unique keys are iterated in the end in the order of [pairs] collection.\n */\npublic operator fun <K, V> Map<out K, V>.plus(pairs: Iterable<Pair<K, V>>): Map<K, V>\n   = if (this.isEmpty()) pairs.toMap() else LinkedHashMap(this).apply { putAll(pairs) }\n\n/**\n * Creates a new read-only map by replacing or adding entries to this map from a given array of key-value [pairs].\n *\n * The returned map preserves the entry iteration order of the original map.\n * Those [pairs] with unique keys are iterated in the end in the order of [pairs] array.\n */\npublic operator fun <K, V> Map<out K, V>.plus(pairs: Array<out Pair<K, V>>): Map<K, V>\n   = if (this.isEmpty()) pairs.toMap() else LinkedHashMap(this).apply { putAll(pairs) }\n\n/**\n * Creates a new read-only map by replacing or adding entries to this map from a given sequence of key-value [pairs].\n *\n * The returned map preserves the entry iteration order of the original map.\n * Those [pairs] with unique keys are iterated in the end in the order of [pairs] sequence.\n */\npublic operator fun <K, V> Map<out K, V>.plus(pairs: Sequence<Pair<K, V>>): Map<K, V>\n   = LinkedHashMap(this).apply { putAll(pairs) }.optimizeReadOnlyMap()\n\n/**\n * Creates a new read-only map by replacing or adding entries to this map from another [map].\n *\n * The returned map preserves the entry iteration order of the original map.\n * Those entries of another [map] that are missing in this map are iterated in the end in the order of that [map].\n */\npublic operator fun <K, V> Map<out K, V>.plus(map: Map<out K, V>): Map<K, V>\n   = LinkedHashMap(this).apply { putAll(map) }\n\n\n/**\n * Appends or replaces the given [pair] in this mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<in K, in V>.plusAssign(pair: Pair<K, V>) {\n   put(pair.first, pair.second)\n}\n\n/**\n * Appends or replaces all pairs from the given collection of [pairs] in this mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<in K, in V>.plusAssign(pairs: Iterable<Pair<K, V>>) {\n   putAll(pairs)\n}\n\n/**\n * Appends or replaces all pairs from the given array of [pairs] in this mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<in K, in V>.plusAssign(pairs: Array<out Pair<K, V>>) {\n   putAll(pairs)\n}\n\n/**\n * Appends or replaces all pairs from the given sequence of [pairs] in this mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<in K, in V>.plusAssign(pairs: Sequence<Pair<K, V>>) {\n   putAll(pairs)\n}\n\n/**\n * Appends or replaces all entries from the given [map] in this mutable map.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<in K, in V>.plusAssign(map: Map<K, V>) {\n   putAll(map)\n}\n\n/**\n * Returns a map containing all entries of the original map except the entry with the given [key].\n *\n * The returned map preserves the entry iteration order of the original map.\n */\n@SinceKotlin(\"1.1\")\npublic operator fun <K, V> Map<out K, V>.minus(key: K): Map<K, V>\n   = this.toMutableMap().apply { minusAssign(key) }.optimizeReadOnlyMap()\n\n/**\n * Returns a map containing all entries of the original map except those entries\n * the keys of which are contained in the given [keys] collection.\n *\n * The returned map preserves the entry iteration order of the original map.\n */\n@SinceKotlin(\"1.1\")\npublic operator fun <K, V> Map<out K, V>.minus(keys: Iterable<K>): Map<K, V>\n   = this.toMutableMap().apply { minusAssign(keys) }.optimizeReadOnlyMap()\n\n/**\n * Returns a map containing all entries of the original map except those entries\n * the keys of which are contained in the given [keys] array.\n *\n * The returned map preserves the entry iteration order of the original map.\n */\n@SinceKotlin(\"1.1\")\npublic operator fun <K, V> Map<out K, V>.minus(keys: Array<out K>): Map<K, V>\n   = this.toMutableMap().apply { minusAssign(keys) }.optimizeReadOnlyMap()\n\n/**\n * Returns a map containing all entries of the original map except those entries\n * the keys of which are contained in the given [keys]

sequence.\n *\n * The returned map preserves the entry iteration order of the original map.\n *\n@SinceKotlin(\"1.1\")\npublic operator fun <K, V> Map<out K, V>.minus(keys: Sequence<K>): Map<K, V>\n   = this.toMutableMap().apply { minusAssign(keys) }.optimizeReadOnlyMap()\n\n/**\n * Removes the entry with the given [key] from this mutable map.\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.minusAssign(key: K) {\n   remove(key)\n}\n\n/**\n * Removes all entries the keys of which are contained in the given [keys] collection from this mutable map.\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.minusAssign(keys: Iterable<K>) {\n   this.keys.removeAll(keys)\n}\n\n/**\n * Removes all entries the keys of which are contained in the given [keys] array from this mutable map.\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.minusAssign(keys: Array<out K>) {\n   this.keys.removeAll(keys)\n}\n\n/**\n * Removes all entries from the keys of which are contained in the given [keys] sequence from this mutable map.\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <K, V> MutableMap<K, V>.minusAssign(keys: Sequence<K>) {\n   this.keys.removeAll(keys)\n}\n\n\n// do not expose for now @PublishedApi\ninternal fun <K, V> Map<K, V>.optimizeReadOnlyMap() = when (size) {\n   0 -> emptyMap()\n   1 -> toSingletonMapOrSelf()\n   else -> this\n}\n\n\n/* Not available on platform: JS */\n\n\n\n/* Not available on platform: JS */\n\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"SetsKt\")\n\npackage kotlin.collections\n\n\ninternal object EmptySet : Set<Nothing>, Serializable {\n   private const val serialVersionUID: Long = 3406603774387020532\n\n   override fun equals(other: Any?): Boolean = other is Set<*> && other.isEmpty()\n   override fun hashCode(): Int = 0\n   override fun toString(): String = \"[]\"\n\n   override val size: Int get() = 0\n   override fun isEmpty(): Boolean = true\n   override fun contains(element: Nothing): Boolean = false\n   override fun containsAll(elements: Collection<Nothing>): Boolean = elements.isEmpty()\n\n   override fun iterator(): Iterator<Nothing> = EmptyIterator\n\n   private fun readResolve(): Any = EmptySet\n}\n\n/**\n * Returns an empty read-only set. The returned set is serializable (JVM).\n * @sample samples.collections.Collections.Sets.emptyReadOnlySet\n */\npublic fun <T> emptySet(): Set<T> = EmptySet\n/**\n * Returns a new read-only set with the given elements.\n * Elements of the set are iterated in the order they were specified.\n * The returned set is serializable (JVM).\n */\npublic fun <T> setOf(vararg elements: T): Set<T> = if (elements.size > 0) elements.toSet() else emptySet()\n\n/**\n * Returns an empty read-only set. The returned set is serializable (JVM).\n * @sample samples.collections.Collections.Sets.emptyReadOnlySet\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> setOf(): Set<T> = emptySet()\n\n/**\n * Returns an empty new [MutableSet].\n *\n * The returned set preserves the element iteration order.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> mutableSetOf(): MutableSet<T> = LinkedHashSet()\n\n/**\n * Returns a new [MutableSet] with the given elements.\n * Elements of the set are iterated in the order they were specified.\n */\npublic fun <T> mutableSetOf(vararg elements: T): MutableSet<T> = elements.toCollection(LinkedHashSet(mapCapacity(elements.size)))\n\n/** Returns an empty new [HashSet].\n *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> hashSetOf(): HashSet<T> = HashSet()\n\n/** Returns a new [HashSet] with the given elements. */\npublic fun <T> hashSetOf(vararg elements: T): HashSet<T> = elements.toCollection(HashSet(mapCapacity(elements.size)))\n\n/** Returns an empty new [LinkedHashSet]. */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> linkedSetOf(): LinkedHashSet<T> = LinkedHashSet()\n\n/**\n * Returns a new [LinkedHashSet] with the given elements.\n * Elements of the set are iterated in the order they were specified.\n */\npublic fun <T> linkedSetOf(vararg elements: T): LinkedHashSet<T> = elements.toCollection(LinkedHashSet(mapCapacity(elements.size)))\n\n/** Returns this Set if it's not `null` and the empty set otherwise. */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Set<T>?.orEmpty(): Set<T> = this ?: emptySet()\n\n/* Not available on platform: JS */\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n/* Not available on platform: JS */\n\n\n\ninternal fun <T> Set<T>.optimizeReadOnlySet() = when (size) {\n   0 -> emptySet()\n   1 -> setOf(iterator().next())\n   else -> this\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the

License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n@file:Suppress(\"PLATFORM_CLASS_MAPPED_TO_KOTLIN\")\n\npackage kotlin.text\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/* Not available on platform: JS *\n\n\n\n\n\n\n/**\n * Parses the string as a signed [Byte] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toByteOrNull(): Byte? = toByteOrNull(radix = 10)\n\n/**\n * Parses the string as a signed [Byte] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toByteOrNull(radix: Int): Byte? {\n   val int = this.toIntOrNull(radix) ?: return null\n   if (int < Byte.MIN_VALUE || int > Byte.MAX_VALUE) return null\n   return int.toByte()\n}\n\n/**\n * Parses the string as a [Short] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toShortOrNull(): Short? = toShortOrNull(radix = 10)\n\n/**\n * Parses the string as a [Short] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toShortOrNull(radix: Int): Short? {\n   val int = this.toIntOrNull(radix) ?: return null\n   if (int < Short.MIN_VALUE || int > Short.MAX_VALUE) return null\n   return int.toShort()\n}\n\n/**\n * Parses the string as an [Int] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toIntOrNull(): Int? = toIntOrNull(radix = 10)\n\n/**\n * Parses the string as an [Int] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toIntOrNull(radix: Int): Int? {\n   checkRadix(radix)\n\n   val length = this.length\n   if (length == 0) return null\n\n   val start: Int\n   val isNegative: Boolean\n   val limit: Int\n\n   val firstChar = this[0]\n   if (firstChar < '0') { // Possible leading sign\n   if (length == 1) return null // non-digit (possible sign) only, no digits after\n\n   start = 1\n\n   if (firstChar == '-') {\n   isNegative = true\n   limit = Int.MIN_VALUE\n   } else if (firstChar == '+') {\n   isNegative = false\n   limit = -Int.MAX_VALUE\n   } else\n   return null\n   } else {\n   start = 0\n   isNegative = false\n   limit = -Int.MAX_VALUE\n   }\n\n\n   val limitBeforeMul = limit / radix\n   var result = 0\n   for (i in start..(length - 1)) {\n   val digit = digitOf(this[i], radix)\n\n   if (digit < 0) return null\n   if (result < limitBeforeMul) return null\n\n   result *= radix\n\n   if (result < limit + digit) return null\n\n   result -= digit\n   }\n\n   return if (isNegative) result else -result\n}\n\n/**\n * Parses the string as a [Long] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toLongOrNull(): Long? = toLongOrNull(radix = 10)\n\n/**\n * Parses the string as a [Long] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n *\n@SinceKotlin(\"1.1\")\npublic fun String.toLongOrNull(radix: Int): Long? {\n   checkRadix(radix)\n\n   val length = this.length\n   if (length == 0) return null\n\n   val start: Int\n   val isNegative: Boolean\n   val limit: Long\n\n   val firstChar = this[0]\n   if (firstChar < '0') { // Possible leading sign\n   if (length == 1) return null // non-digit (possible sign) only, no digits after\n\n   start = 1\n\n   if (firstChar == '-')

{\n   isNegative = true\n   limit = Long.MIN_VALUE\n   } else if (firstChar == '+') {\n   isNegative = false\n   limit = -Long.MAX_VALUE\n   } else\n   return null\n   } else {\n   start = 0\n   isNegative = false\n   limit = -Long.MAX_VALUE\n   }\n\n   val limitBeforeMul = limit / radix\n   var result = 0L\n   for (i in start..(length - 1)) {\n   val digit = digitOf(this[i], radix)\n\n   if (digit < 0) return null\n   if (result < limitBeforeMul) return null\n\n   result *= radix\n   if (result < limit + digit) return null\n\n   result -= digit\n   }\n\n   return if (isNegative) result else -result\n}\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"PreconditionsKt\")\n\npackage kotlin\n\nimport kotlin.internal.contracts.*\n\n/**\n * Throws an [IllegalArgumentException] if the [value] is false.\n *\n * @sample samples.misc.Preconditions.failRequireWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun require(value: Boolean): Unit {\n   contract {\n   returns() implies value\n   }\n   require(value) { \"Failed requirement.\" }\n}\n\n/**\n * Throws an [IllegalArgumentException] with the result of calling [lazyMessage] if the [value] is false.\n *\n * @sample samples.misc.Preconditions.failRequireWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun require(value: Boolean, lazyMessage: () -> Any): Unit {\n   contract {\n   returns() implies value\n   }\n   if (!value) {\n   val message = lazyMessage()\n   throw IllegalArgumentException(message.toString())\n   }\n}\n\n/**\n * Throws an [IllegalArgumentException] if the [value] is null. Otherwise returns the not null value.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T:Any> requireNotNull(value: T?): T {\n   contract {\n   returns() implies (value != null)\n   }\n   return requireNotNull(value) { \"Required value was null.\" }\n}\n\n/**\n * Throws an [IllegalArgumentException] with the result of calling [lazyMessage] if the [value] is null. Otherwise\n * returns the not null value.\n *\n * @sample samples.misc.Preconditions.failRequireWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T:Any> requireNotNull(value: T?, lazyMessage: () -> Any): T {\n   contract {\n   returns() implies (value != null)\n   }\n\n   if (value == null) {\n   val message = lazyMessage()\n   throw IllegalArgumentException(message.toString())\n   } else {\n   return value\n   }\n}\n\n/**\n * Throws an [IllegalStateException] if the [value] is false.\n *\n * @sample samples.misc.Preconditions.failCheckWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun check(value: Boolean): Unit {\n   contract {\n   returns() implies value\n   }\n   check(value) { \"Check failed.\" }\n}\n\n/**\n * Throws an [IllegalStateException] with the result of calling [lazyMessage] if the [value] is false.\n *\n * @sample samples.misc.Preconditions.failCheckWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun check(value: Boolean, lazyMessage: () -> Any): Unit {\n   contract {\n   returns() implies value\n   }\n   if (!value) {\n   val message = lazyMessage()\n   throw IllegalStateException(message.toString())\n   }\n}\n\n/**\n * Throws an [IllegalStateException] if the [value] is null. Otherwise\n * returns the not null value.\n *\n * @sample samples.misc.Preconditions.failCheckWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T:Any> checkNotNull(value: T?): T = checkNotNull(value) { \"Required value was null.\" }\n\n/**\n * Throws an [IllegalStateException] with the result of calling [lazyMessage] if the [value] is null. Otherwise\n * returns the not null value.\n *\n * @sample samples.misc.Preconditions.failCheckWithLazyMessage\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T:Any> checkNotNull(value: T?, lazyMessage: () -> Any): T {\n   contract {\n   returns() implies (value != null)\n   }\n\n   if (value == null) {\n   val message = lazyMessage()\n   throw IllegalStateException(message.toString())\n   } else {\n   return value\n   }\n}\n\n\n/**\n * Throws an [IllegalStateException] with the given [message].\n *\n * @sample samples.misc.Preconditions.failWithError\n */\n@kotlin.internal.InlineOnly\npublic inline fun error(message: Any): Nothing = throw IllegalStateException(message.toString())\n","/*\n * Copyright 2010-2014 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in

compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\n@file:kotlin.jvm.JvmName(\"ComparisonsKt\")\n@file:kotlin.jvm.JvmMultifileClass\n\npackage kotlin.comparisons\n\n/**\n * Compares two values using the specified functions [selectors] to calculate the result of the comparison.\n * The functions are called sequentially, receive the given values [a] and [b] and return [Comparable]\n * objects. As soon as the [Comparable] instances returned by a function for [a] and [b] values do not\n * compare as equal, the result of that comparison is returned.\n *\n * @sample samples.comparisons.Comparisons.compareValuesByWithSelectors\n */\npublic fun <T> compareValuesBy(a: T, b: T, vararg selectors: (T) -> Comparable<*>?): Int {\n   require(selectors.size > 0)\n   return compareValuesByImpl(a, b, selectors)\n}\n\nprivate fun <T> compareValuesByImpl(a: T, b: T, selectors: Array<out (T)->Comparable<*>?>): Int {\n   for (fn in selectors) {\n   val v1 = fn(a)\n   val v2 = fn(b)\n   val diff = compareValues(v1, v2)\n   if (diff != 0) return diff\n   }\n   return 0\n}\n\n/**\n * Compares two values using the specified [selector] function to calculate the result of the comparison.\n * The function is applied to the given values [a] and [b] and return [Comparable] objects.\n * The result of comparison of these [Comparable] instances is returned.\n *\n * @sample samples.comparisons.Comparisons.compareValuesByWithSingleSelector\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> compareValuesBy(a: T, b: T, selector: (T) -> Comparable<*>?): Int {\n   return compareValues(selector(a), selector(b))\n}\n\n/**\n * Compares two values using the specified [selector] function to calculate the result of the comparison.\n * The function is applied to the given values [a] and [b] and return objects of type K which are then being\n * compared with the given [comparator].\n *\n * @sample samples.comparisons.Comparisons.compareValuesByWithComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T, K> compareValuesBy(a: T, b: T, comparator: Comparator<in K>, selector: (T) -> K): Int {\n   return comparator.compare(selector(a), selector(b))\n}\n\n//// Not so useful without type inference for receiver of expression\n//// compareValuesWith(v1, v2, compareBy { it.prop1 } thenByDescending { it.prop2 })\n///**\n// * Compares two values using the specified [comparator].\n// *\n//@Suppress(\"NOTHING_TO_INLINE\")\n//public inline fun <T> compareValuesWith(a: T, b: T, comparator: Comparator<T>): Int = comparator.compare(a, b)\n\n\n/**\n * Compares two nullable [Comparable] values. Null is considered less than any value.\n *\n * @sample samples.comparisons.Comparisons.compareValues\n */\npublic fun <T : Comparable<*>> compareValues(a: T?, b: T?): Int {\n   if (a === b) return 0\n   if (a == null) return -1\n   if (b == null) return 1\n\n   @Suppress(\"UNCHECKED_CAST\")\n   return (a as Comparable<Any>).compareTo(b)\n}\n\n/**\n * Creates a comparator using the sequence of functions to calculate a result of comparison.\n * The functions are called sequentially, receive the given values `a` and `b` and return [Comparable]\n * objects. As soon as the [Comparable] instances returned by a function for `a` and `b` values do not\n * compare as equal, the result of that comparison is returned from the [Comparator].\n *\n * @sample samples.comparisons.Comparisons.compareByWithSelectors\n */\npublic fun <T> compareBy(vararg selectors: (T) -> Comparable<*>?): Comparator<T> {\n   require(selectors.size > 0)\n   return Comparator { a, b -> compareValuesByImpl(a, b, selectors) }\n}\n\n/**\n * Creates a comparator using the function to transform value to a [Comparable] instance for comparison.\n *\n * @sample samples.comparisons.Comparisons.compareByWithSingleSelector\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> compareBy(crossinline selector: (T) -> Comparable<*>?): Comparator<T> =\n   Comparator { a, b -> compareValuesBy(a, b, selector) }\n\n/**\n * Creates a comparator using the [selector] function to transform values being compared and then applying\n * the specified [comparator] to compare transformed values.\n *\n * @sample samples.comparisons.Comparisons.compareByWithComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T, K> compareBy(comparator: Comparator<in K>, crossinline selector: (T) -> K): Comparator<T> =\n   Comparator { a, b -> compareValuesBy(a, b, comparator, selector) }\n\n/**\n * Creates a descending comparator using the function to transform value to a [Comparable] instance for comparison.\n *\n * @sample

samples.comparisons.Comparisons.compareByDescendingWithSingleSelector\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> compareByDescending(crossinline selector: (T) -> Comparable<*>?): Comparator<T> =\n   Comparator { a, b -> compareValuesBy(b, a, selector) }\n\n/**\n * Creates a descending comparator using the [selector] function to transform values being compared and then applying\n * the specified [comparator] to compare transformed values.\n *\n * Note that an order of [comparator] is reversed by this wrapper.\n *\n * @sample samples.comparisons.Comparisons.compareByDescendingWithComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T, K> compareByDescending(comparator: Comparator<in K>, crossinline selector: (T) -> K): Comparator<T> =\n   Comparator { a, b -> compareValuesBy(b, a, comparator, selector) }\n\n/**\n * Creates a comparator comparing values after the primary comparator defined them equal. It uses\n * the function to transform value to a [Comparable] instance for comparison.\n *\n * @sample samples.comparisons.Comparisons.thenBy\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Comparator<T>.thenBy(crossinline selector: (T) -> Comparable<*>?): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@thenBy.compare(a, b)\n   if (previousCompare != 0) previousCompare else compareValuesBy(a, b, selector)\n   }\n\n/**\n * Creates a comparator comparing values after the primary comparator defined them equal. It uses\n * the [selector] function to transform values and then compares them with the given [comparator].\n *\n * @sample samples.comparisons.Comparisons.thenByWithComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T, K> Comparator<T>.thenBy(comparator: Comparator<in K>, crossinline selector: (T) -> K): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@thenBy.compare(a, b)\n   if (previousCompare != 0) previousCompare else compareValuesBy(a, b, comparator, selector)\n   }\n\n/**\n * Creates a descending comparator using the primary comparator and\n * the function to transform value to a [Comparable] instance for comparison.\n *\n * @sample samples.comparisons.Comparisons.thenByDescending\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Comparator<T>.thenByDescending(crossinline selector: (T) -> Comparable<*>?): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@thenByDescending.compare(a, b)\n   if (previousCompare != 0) previousCompare else compareValuesBy(b, a, selector)\n   }\n\n/**\n * Creates a descending comparator comparing values after the primary comparator defined them equal. It uses\n * the [selector] function to transform values and then compares them with the given [comparator].\n *\n * @sample samples.comparisons.Comparisons.thenByDescendingWithComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T, K> Comparator<T>.thenByDescending(comparator: Comparator<in K>, crossinline selector: (T) -> K): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@thenByDescending.compare(a, b)\n   if (previousCompare != 0) previousCompare else compareValuesBy(b, a, comparator, selector)\n   }\n\n\n/**\n * Creates a comparator using the primary\n * comparator and function to calculate a result of comparison.\n *\n * @sample samples.comparisons.Comparisons.thenComparator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Comparator<T>.thenComparator(crossinline comparison: (a: T, b: T) -> Int): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@thenComparator.compare(a, b)\n   if (previousCompare != 0) previousCompare else comparison(a, b)\n   }\n\n/**\n * Combines this comparator and the given [comparator] such that the latter is applied only\n * when the former considered values equal.\n *\n * @sample samples.comparisons.Comparisons.then\n */\npublic infix fun <T> Comparator<T>.then(comparator: Comparator<in T>): Comparator<T> =\n   Comparator { a, b ->\n   val previousCompare = this@then.compare(a, b)\n   if (previousCompare != 0) previousCompare else comparator.compare(a, b)\n   }\n\n/**\n * Combines this comparator and the given [comparator] such that the latter is applied only\n * when the former considered values equal.\n *\n * @sample samples.comparisons.Comparisons.thenDescending\n */\npublic infix fun <T> Comparator<T>.thenDescending(comparator: Comparator<in T>): Comparator<T> =\n   Comparator<T> { a, b ->\n   val previousCompare = this@thenDescending.compare(a, b)\n   if (previousCompare != 0) previousCompare else comparator.compare(b, a)\n   }\n\n// Not so useful without type inference for receiver of expression\n/**\n * Extends the given [comparator] of non-nullable values to a comparator

of nullable values\n * considering `null` value less than any other value.\n *\n * @sample
samples.comparisons.Comparisons.nullsFirstLastWithComparator\n */\npublic fun <T: Any> nullsFirst(comparator:
Comparator<in T>): Comparator<T?> =\n   Comparator { a, b ->\n   when {\n   a === b -> 0\n
    a == null -> -1\n   b == null -> 1\n   else -> comparator.compare(a, b)\n   }\n
}\n\n/**\n * Provides a comparator of nullable [Comparable] values\n * considering `null` value less than any other
value.\n *\n * @sample samples.comparisons.Comparisons.nullsFirstLastComparator\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun <T: Comparable<T>> nullsFirst(): Comparator<T?> =
nullsFirst(naturalOrder())\n\n/**\n * Extends the given [comparator] of non-nullable values to a comparator of
nullable values\n * considering `null` value greater than any other value.\n *\n * @sample
samples.comparisons.Comparisons.nullsFirstLastWithComparator\n */\npublic fun <T: Any> nullsLast(comparator:
Comparator<in T>): Comparator<T?> =\n   Comparator { a, b ->\n   when {\n   a === b -> 0\n
    a == null -> 1\n   b == null -> -1\n   else -> comparator.compare(a, b)\n   }\n
}\n\n/**\n * Provides a comparator of nullable [Comparable] values\n * considering `null` value greater than any
other value.\n *\n * @sample samples.comparisons.Comparisons.nullsFirstLastComparator\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun <T: Comparable<T>> nullsLast(): Comparator<T?> =
nullsLast(naturalOrder())\n\n/**\n * Returns a comparator that compares [Comparable] objects in natural order.\n
*\n * @sample samples.comparisons.Comparisons.naturalOrderComparator\n */\npublic fun <T: Comparable<T>>
naturalOrder(): Comparator<T> = @Suppress(\"UNCHECKED_CAST\") (NaturalOrderComparator as
Comparator<T>)\n\n/**\n * Returns a comparator that compares [Comparable] objects in reversed natural order.\n
*\n * @sample samples.comparisons.Comparisons.nullsFirstLastWithComparator\n */\npublic fun <T:
Comparable<T>> reverseOrder(): Comparator<T> = @Suppress(\"UNCHECKED_CAST\")
(ReverseOrderComparator as Comparator<T>)\n\n/**\n * Returns a comparator that imposes the reverse ordering
of this comparator.\n *\n * @sample samples.comparisons.Comparisons.reversed\n */\npublic fun <T>
Comparator<T>.reversed(): Comparator<T> = when (this) {\n   is ReversedComparator -> this.comparator\n
NaturalOrderComparator -> @Suppress(\"UNCHECKED_CAST\") (ReverseOrderComparator as
Comparator<T>)\n   ReverseOrderComparator -> @Suppress(\"UNCHECKED_CAST\")
(NaturalOrderComparator as Comparator<T>)\n   else -> ReversedComparator(this)\n}\n\n\nprivate class
ReversedComparator<T>(public val comparator: Comparator<T>): Comparator<T> {\n   override fun compare(a:
T, b: T): Int = comparator.compare(b, a)\n   @Suppress(\"VIRTUAL_MEMBER_HIDDEN\")\n   fun reversed():
Comparator<T> = comparator\n}\n\nprivate object NaturalOrderComparator : Comparator<Comparable<Any>> {\n
  override fun compare(a: Comparable<Any>, b: Comparable<Any>): Int = a.compareTo(b)\n
@Suppress(\"VIRTUAL_MEMBER_HIDDEN\")\n   fun reversed(): Comparator<Comparable<Any>> =
ReverseOrderComparator\n}\n\nprivate object ReverseOrderComparator: Comparator<Comparable<Any>> {\n
override fun compare(a: Comparable<Any>, b: Comparable<Any>): Int = b.compareTo(a)\n
@Suppress(\"VIRTUAL_MEMBER_HIDDEN\")\n   fun reversed(): Comparator<Comparable<Any>> =
NaturalOrderComparator\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache
License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You
may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required
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BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the
License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage
kotlin\n\n\npublic interface Comparator<T> {\n   @JsName(\"compare\") fun compare(a: T, b: T): Int\n}\n\npublic
inline fun <T> Comparator(crossinline comparison: (a: T, b: T) -> Int): Comparator<T> = object : Comparator<T>
{\n   override fun compare(a: T, b: T): Int = comparison(a,
b)\n}\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StandardKt\")\npackage
kotlin\n\nimport kotlin.internal.contracts.*\n\n/**\n * An exception is thrown to indicate that a method body
remains to be implemented.\n */\npublic class NotImplementedError(message: String = \"An operation is not
implemented.\") : Error(message)\n\n/**\n * Always throws [NotImplementedError] stating that operation is not

implemented.\n *\n\n@kotlin.internal.InlineOnly\npublic inline fun TODO(): Nothing = throw NotImplementedError()\n\n/**\n * Always throws [NotImplementedError] stating that operation is not implemented.\n *\n * @param reason a string explaining why the implementation is missing.\n *\n@kotlin.internal.InlineOnly\npublic inline fun TODO(reason: String): Nothing = throw NotImplementedError(\"An operation is not implemented: $reason\")\n\n\n/**\n * Calls the specified function [block] and returns its result.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <R> run(block: () -> R): R {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   return block()\n}\n\n/**\n * Calls the specified function [block] with `this` value as its receiver and returns its result.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T, R> T.run(block: T.() -> R): R {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   return block()\n}\n\n/**\n * Calls the specified function [block] with the given [receiver] as its receiver and returns its result.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T, R> with(receiver: T, block: T.() -> R): R {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   return receiver.block()\n}\n\n/**\n * Calls the specified function [block] with `this` value as its receiver and returns `this` value.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T> T.apply(block: T.() -> Unit): T {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   block()\n   return this\n}\n\n/**\n * Calls the specified function [block] with `this` value as its argument and returns `this` value.\n *\n@kotlin.internal.InlineOnly\n@SinceKotlin(\"1.1\")\npublic inline fun <T> T.also(block: (T) -> Unit): T {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   block(this)\n   return this\n}\n\n/**\n * Calls the specified function [block] with `this` value as its argument and returns its result.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <T, R> T.let(block: (T) -> R): R {\n   contract {\n   callsInPlace(block, InvocationKind.EXACTLY_ONCE)\n   }\n   return block(this)\n}\n\n/**\n * Returns `this` value if it satisfies the given [predicate] or `null`, if it doesn't.\n *\n@kotlin.internal.InlineOnly\n@SinceKotlin(\"1.1\")\npublic inline fun <T> T.takeIf(predicate: (T) -> Boolean): T? {\n   contract {\n   callsInPlace(predicate, InvocationKind.EXACTLY_ONCE)\n   }\n   return if (predicate(this)) this else null\n}\n\n/**\n * Returns `this` value if it _does not_ satisfy the given [predicate] or `null`, if it does.\n *\n@kotlin.internal.InlineOnly\n@SinceKotlin(\"1.1\")\npublic inline fun <T> T.takeUnless(predicate: (T) -> Boolean): T? {\n   contract {\n   callsInPlace(predicate, InvocationKind.EXACTLY_ONCE)\n   }\n   return if (!predicate(this)) this else null\n}\n\n/**\n * Executes the given function [action] specified number of [times].\n *\n * A zero-based index of current iteration is passed as a parameter to [action].\n *\n@kotlin.internal.InlineOnly\npublic inline fun repeat(times: Int, action: (Int) -> Unit) {\n   contract { callsInPlace(action) }\n\n   for (index in 0 until times) {\n   action(index)\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\n\n@JsName(\"arrayIterator\")\ninternal fun arrayIterator(array: dynamic, type: String?) = when (type) {\n   null -> {\n   val arr: Array<dynamic> = array\n   object : Iterator<dynamic> {\n   var index = 0\n   override fun hasNext() = index < arr.size\n   override fun next() = if (index < arr.size) arr[index++] else throw NoSuchElementException(\"$index\")\n   }\n   }\n   \"BooleanArray\" -> booleanArrayIterator(array)\n   \"ByteArray\" -> byteArrayIterator(array)\n   \"ShortArray\" -> shortArrayIterator(array)\n   \"CharArray\" -> charArrayIterator(array)\n   \"IntArray\" -> intArrayIterator(array)\n   \"LongArray\" -> longArrayIterator(array)\n   \"FloatArray\" -> floatArrayIterator(array)\n   \"DoubleArray\" -> doubleArrayIterator(array)\n   else -> throw IllegalStateException(\"Unsupported type argument for arrayIterator: $type\")\n}\n\n@JsName(\"booleanArrayIterator\")\ninternal fun booleanArrayIterator(array: BooleanArray) = object : BooleanIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun

nextBoolean() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"byteArrayIterator\")\ninternal fun byteArrayIterator(array: ByteArray) = object : ByteIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextByte() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"shortArrayIterator\")\ninternal fun shortArrayIterator(array: ShortArray) = object : ShortIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextShort() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"charArrayIterator\")\ninternal fun charArrayIterator(array: CharArray) = object : CharIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextChar() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"intArrayIterator\")\ninternal fun intArrayIterator(array: IntArray) = object : IntIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextInt() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"floatArrayIterator\")\ninternal fun floatArrayIterator(array: FloatArray) = object : FloatIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextFloat() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"doubleArrayIterator\")\ninternal fun doubleArrayIterator(array: DoubleArray) = object : DoubleIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextDouble() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"longArrayIterator\")\ninternal fun longArrayIterator(array: LongArray) = object : LongIterator() {\n   var index = 0\n   override fun hasNext() = index < array.size\n   override fun nextLong() = if (index < array.size) array[index++] else throw NoSuchElementException(\"$index\")\n}\n\n@JsName(\"PropertyMetadata\")\ninternal class PropertyMetadata(@JsName(\"callableName\") val name: String)\n\n@JsName(\"noWhenBranchMatched\")\ninternal fun noWhenBranchMatched(): Nothing = throw NoWhenBranchMatchedException()\n\n@JsName(\"subSequence\")\ninternal fun subSequence(c: CharSequence, startIndex: Int, endIndex: Int): CharSequence {\n   if (c is String) {\n   return c.substring(startIndex, endIndex)\n   } else {\n   return c.asDynamic().`subSequence_vux9f0$`(startIndex, endIndex)\n   }\n}\n\n@JsName(\"captureStack\")\ninternal fun captureStack(baseClass: JsClass<in Throwable>, instance: Throwable) {\n   if (js(\"Error\").captureStackTrace) {\n   js(\"Error\").captureStackTrace(instance, instance::class.js);\n   } else {\n   instance.asDynamic().stack = js(\"new Error()\").stack;\n   }\n}\n\n@JsName(\"newThrowable\")\ninternal fun newThrowable(message: String?, cause: Throwable?): Throwable {\n   val throwable = js(\"new Error()\")\n   throwable.message = if (jsTypeOf(message) == \"undefined\") {\n   if (cause != null) cause.toString() else null\n   } else {\n   message\n   }\n   throwable.cause = cause\n   throwable.name = \"Throwable\"\n   return throwable\n}\n\n@JsName(\"BoxedChar\")\ninternal class BoxedChar(val c: Int) : Comparable<Int> {\n   override fun equals(other: Any?): Boolean {\n   return other is BoxedChar && c == other.c\n   }\n\n   override fun hashCode(): Int {\n   return c\n   }\n\n   override fun toString(): String {\n   return js(\"this.c\").unsafeCast<Char>().toString()\n   }\n\n   override fun compareTo(other: Int): Int {\n   return js(\"this.c - other\").unsafeCast<Int>()\n   }\n\n   @JsName(\"valueOf\")\n   public fun valueOf(): Int {\n   return c\n   }\n}\n\n@kotlin.internal.InlineOnly\ninternal inline fun <T> concat(args: Array<T>): T {\n   val typed = js(\"Array\")(args.size)\n   for (i in args.indices) {\n   val arr = args[i]\n   if (arr !is Array<*>) {\n   typed[i] = js(\"[]\").slice.call(arr)\n   } else {\n   typed[i] = arr\n   }\n   }\n   return js(\"[]\").concat.apply(js(\"[]\"), typed);\n}\n\n/** Concat regular Array's and TypedArray's into an Array.\n */\n@PublishedApi\n@JsName(\"arrayConcat\")\n@Suppress(\"UNUSED_PARAMETER\")\ninternal fun <T> arrayConcat(a: T, b: T): T {\n   return concat(js(\"arguments\"))\n}\n\n/** Concat primitive arrays. Main use: prepare vararg arguments.\n * For compatibility with 1.1.0 the arguments may be a mixture of Array's and TypedArray's.\n *\n * If the first argument is TypedArray (Byte-, Short-, Char-, Int-, Float-, and DoubleArray)

returns a TypedArray, otherwise an Array.\n * If the first argument has the $type$ property (Boolean-, Char-, and LongArray) copy its value to result.$type$.\n * If the first argument is a regular Array without the $type$ property default to arrayConcat.\n
/\n@PublishedApi\n@JsName(\"primitiveArrayConcat\")\n@Suppress(\"UNUSED_PARAMETER\")\ninternal fun <T> primitiveArrayConcat(a: T, b: T): T {\n   val args: Array<T> = js(\"arguments\")\n   if (a is Array<> && a.asDynamic().`$type$` === undefined) {\n   return concat(args)\n   }\n   else {\n   var size = 0\n   for (i in args.indices) {\n   size += args[i].asDynamic().length as Int\n   }\n   val result = js(\"new a.constructor(size)\")\n   kotlin.copyArrayType(a, result)\n   size = 0\n   for (i in args.indices) {\n   val arr = args[i].asDynamic()\n   for (j in 0 until arr.length) {\n   result[size++] = arr[j]\n   }\n   }\n   return result\n   }\n}\n\n@JsName(\"booleanArrayOf\")\ninternal fun booleanArrayOf() = withType(\"BooleanArray\", js(\"[].slice.call(arguments)\"))\n\n@JsName(\"charArrayOf\") // The arguments have to be slice'd here because of Rhino (see KT-16974)\ninternal fun charArrayOf() = withType(\"CharArray\", js(\"new Uint16Array([].slice.call(arguments))\"))\n\n@JsName(\"longArrayOf\")\ninternal fun longArrayOf() = withType(\"LongArray\", js(\"[].slice.call(arguments)\"))\n\n@JsName(\"withType\")\n@kotlin.internal.InlineOnly\ninternal inline fun withType(type: String, array: dynamic): dynamic {\n   array.`$type$` = type\n   return array\n}","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"ComparisonsKt\")\n\npackage kotlin.comparisons\n\n/\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n/\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Returns the greater of two values.\n * If values are equal, returns the first one.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T: Comparable<T>> maxOf(a: T, b: T): T {\n   return if (a >= b) a else b\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Byte, b: Byte): Byte {\n   return Math.max(a.toInt(), b.toInt()).unsafeCast<Byte>()\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Short, b: Short): Short {\n   return Math.max(a.toInt(), b.toInt()).unsafeCast<Short>()\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Int, b: Int): Int {\n   return Math.max(a, b)\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun maxOf(a: Long, b: Long): Long {\n   return if (a >= b) a else b\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Float, b: Float): Float {\n   return Math.max(a, b)\n}\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Double, b: Double): Double {\n   return Math.max(a, b)\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T: Comparable<T>> maxOf(a: T, b: T, c: T): T {\n   return maxOf(a, maxOf(b, c))\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Byte, b: Byte, c: Byte): Byte {\n   return Math.max(a.toInt(), b.toInt(), c.toInt()).unsafeCast<Byte>()\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Short, b: Short, c: Short): Short {\n   return Math.max(a.toInt(), b.toInt(), c.toInt()).unsafeCast<Short>()\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Int, b: Int, c: Int): Int {\n   return Math.max(a, b, c)\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Long, b: Long, c: Long): Long {\n   return maxOf(a, maxOf(b, c))\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Float, b: Float, c: Float): Float {\n   return Math.max(a, b, c)\n}\n\n/**\n * Returns the greater of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun maxOf(a: Double, b: Double, c: Double): Double {\n   return Math.max(a, b, c)\n}\n\n/**\n * Returns the greater of three values according to the order specified by the given [comparator].\n */\n@SinceKotlin(\"1.1\")\npublic fun <T> maxOf(a: T, b: T, c: T,

comparator: Comparator<in T>): T {\n   return maxOf(a, maxOf(b, c, comparator), comparator)\n}\n\n/**\n *
Returns the greater of two values according to the order specified by the given [comparator].\n * If values are equal,
returns the first one.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T> maxOf(a: T, b: T, comparator: Comparator<in
T>): T {\n   return if (comparator.compare(a, b) >= 0) a else b\n}\n\n/**\n * Returns the smaller of two values.\n *
If values are equal, returns the first one.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T: Comparable<T>> minOf(a: T,
b: T): T {\n   return if (a <= b) a else b\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Byte, b: Byte): Byte {\n
return Math.min(a.toInt(), b.toInt()).unsafeCast<Byte>()\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Short, b: Short): Short {\n
return Math.min(a.toInt(), b.toInt()).unsafeCast<Short>()\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Int, b: Int): Int {\n   return
Math.min(a, b)\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun minOf(a: Long, b: Long):
Long {\n   return if (a <= b) a else b\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Float, b: Float): Float {\n
return Math.min(a, b)\n}\n\n/**\n * Returns the smaller of two values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Double, b: Double): Double {\n
return Math.min(a, b)\n}\n\n/**\n * Returns the smaller of three values.\n */\n@SinceKotlin(\"1.1\")\npublic fun
<T: Comparable<T>> minOf(a: T, b: T, c: T): T {\n   return minOf(a, minOf(b, c))\n}\n\n/**\n * Returns the
smaller of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Byte,
b: Byte, c: Byte): Byte {\n   return Math.min(a.toInt(), b.toInt(), c.toInt()).unsafeCast<Byte>()\n}\n\n/**\n *
Returns the smaller of three values.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun
minOf(a: Short, b: Short, c: Short): Short {\n   return Math.min(a.toInt(), b.toInt(),
c.toInt()).unsafeCast<Short>()\n}\n\n/**\n * Returns the smaller of three values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Int, b: Int, c: Int): Int {\n
return Math.min(a, b, c)\n}\n\n/**\n * Returns the smaller of three values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Long, b: Long, c: Long): Long
{\n   return minOf(a, minOf(b, c))\n}\n\n/**\n * Returns the smaller of three values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Float, b: Float, c: Float): Float
{\n   return Math.min(a, b, c)\n}\n\n/**\n * Returns the smaller of three values.\n
*/\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun minOf(a: Double, b: Double, c: Double):
Double {\n   return Math.min(a, b, c)\n}\n\n/**\n * Returns the smaller of three values according to the order
specified by the given [comparator].\n */\n@SinceKotlin(\"1.1\")\npublic fun <T> minOf(a: T, b: T, c: T,
comparator: Comparator<in T>): T {\n   return minOf(a, minOf(b, c, comparator), comparator)\n}\n\n/**\n *
Returns the smaller of two values according to the order specified by the given [comparator].\n * If values are equal,
returns the first one.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T> minOf(a: T, b: T, comparator: Comparator<in
T>): T {\n   return if (comparator.compare(a, b) <= 0) a else b\n}\n\n","/*\n * Copyright 2010-2016 JetBrains
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in compliance with the License.\n * You may obtain a copy of the License at\n *\n *
http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing,
software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES
OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language
governing permissions and\n * limitations under the License.\n
*/\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\npackage
kotlin.collections\n\n/**\n * Given an [iterator] function constructs an [Iterable] instance that returns values through
the [Iterator]\n * provided by that function.\n * @sample samples.collections.Iterables.Building.iterable\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable(crossinline iterator: () -> Iterator<T>): Iterable<T>
= object : Iterable<T> {\n   override fun iterator(): Iterator<T> = iterator()\n}\n\n/**\n * A wrapper over another

[Iterable] (or any other object that can produce an [Iterator]) that returns\n * an indexing iterator.\n */\ninternal class IndexingIterable<out T>(private val iteratorFactory: () -> Iterator<T>) : Iterable<IndexedValue<T>> {\n   override fun iterator(): Iterator<IndexedValue<T>> = IndexingIterator(iteratorFactory())\n}\n\n\n/**\n * Returns the size of this iterable if it is known, or `null` otherwise.\n */\n@PublishedApi\ninternal fun <T> Iterable<T>.collectionSizeOrNull(): Int? = if (this is Collection<*>) this.size else null\n\n/**\n * Returns the size of this iterable if it is known, or the specified [default] value otherwise.\n */\n@PublishedApi\ninternal fun <T> Iterable<T>.collectionSizeOrDefault(default: Int): Int = if (this is Collection<*>) this.size else default\n\n/** Returns true when it's safe to convert this collection to a set without changing contains method behavior. */\nprivate fun <T> Collection<T>.safeToConvertToSet() = size > 2 && this is ArrayList\n\n/** Converts this collection to a set, when it's worth so and it doesn't change contains method behavior. */\ninternal fun <T> Iterable<T>.convertToSetForSetOperationWith(source: Iterable<T>): Collection<T> =\n   when(this) {\n   is Set -> this\n   is Collection ->\n   when {\n   source is Collection && source.size < 2 -> this\n   else -> if (this.safeToConvertToSet()) toHashSet() else this\n   }\n   else -> toHashSet()\n   }\n\n/** Converts this collection to a set, when it's worth so and it doesn't change contains method behavior. */\ninternal fun <T> Iterable<T>.convertToSetForSetOperation(): Collection<T> =\n   when(this) {\n   is Set -> this\n   is Collection -> if (this.safeToConvertToSet()) toHashSet() else this\n   else -> toHashSet()\n   }\n\n\n/**\n * Returns a single list of all elements from all collections in the given collection.\n * @sample samples.collections.Iterables.Operations.flattenIterable\n */\npublic fun <T> Iterable<Iterable<T>>.flatten(): List<T> {\n   val result = ArrayList<T>()\n   for (element in this) {\n   result.addAll(element)\n   }\n   return result\n}\n\n/**\n * Returns a pair of lists, where\n * *first* list is built from the first values of each pair from this collection,\n * *second* list is built from the second values of each pair from this collection.\n * @sample samples.collections.Iterables.Operations.unzipIterable\n */\npublic fun <T, R> Iterable<Pair<T, R>>.unzip(): Pair<List<T>, List<R>> {\n   val expectedSize = collectionSizeOrDefault(10)\n   val listT = ArrayList<T>(expectedSize)\n   val listR = ArrayList<R>(expectedSize)\n   for (pair in this) {\n   listT.add(pair.first)\n   listR.add(pair.second)\n   }\n   return listT to listR\n}\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"SequencesKt\")\n\npackage kotlin.sequences\n\n/**\n * Given an [iterator] function constructs a [Sequence] that returns values through the [Iterator]\n * provided by that function.\n * The values are evaluated lazily, and the sequence is potentially infinite.\n *\n * @sample samples.collections.Sequences.Building.sequenceFromIterator\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence(crossinline iterator: () -> Iterator<T>): Sequence<T> = object : Sequence<T> {\n   override fun iterator(): Iterator<T> = iterator()\n}\n\n/**\n * Creates a sequence that returns all elements from this iterator. The sequence is constrained to be iterated only once.\n *\n * @sample samples.collections.Sequences.Building.sequenceFromIterator\n */\npublic fun <T> Iterator<T>.asSequence(): Sequence<T> = Sequence { this }.constrainOnce()\n\n/* Not available on platform: JS */\n\n\n\n\n\n/**\n * Creates a sequence that returns the specified values.\n *\n * @sample samples.collections.Sequences.Building.sequenceOfValues\n */\npublic fun <T> sequenceOf(vararg elements: T): Sequence<T> = if (elements.isEmpty()) emptySequence() else elements.asSequence()\n\n/**\n * Returns an empty sequence.\n */\npublic fun <T> emptySequence(): Sequence<T> = EmptySequence\n\nprivate object EmptySequence : Sequence<Nothing>, DropTakeSequence<Nothing> {\n   override fun iterator(): Iterator<Nothing> = EmptyIterator\n   override fun drop(n: Int) = EmptySequence\n   override fun take(n: Int) = EmptySequence\n}\n\n/**\n * Returns a sequence of all elements from all sequences in this sequence.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<Sequence<T>>.flatten(): Sequence<T> = flatten { it.iterator() }\n\n/**\n * Returns a sequence of all elements from all iterables in this sequence.\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@kotlin.jvm.JvmName(\"flattenSequenceOfIterable\")\npublic fun <T> Sequence<Iterable<T>>.flatten(): Sequence<T> = flatten { it.iterator() }\n\nprivate fun <T, R> Sequence<T>.flatten(iterator: (T) -> Iterator<R>): Sequence<R> {\n   if (this is TransformingSequence<*, *>) {\n   return (this as TransformingSequence<*, T>).flatten(iterator)\n   }\n   return FlatteningSequence(this, { it }, iterator)\n}\n\n/**\n * Returns a pair of lists, where\n * *first* list is built from the first values of each pair from this

sequence,\n * *second* list is built from the second values of each pair from this sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T, R> Sequence<Pair<T, R>>.unzip(): Pair<List<T>, List<R>> {\n   val listT = ArrayList<T>()\n   val listR = ArrayList<R>()\n   for (pair in this) {\n   listT.add(pair.first)\n   listR.add(pair.second)\n   }\n   return listT to listR\n}\n\n/**\n * A sequence that returns the values from the underlying [sequence] that either match or do not match\n * the specified [predicate].\n *\n * @param sendWhen If `true`, values for which the predicate returns `true` are returned. Otherwise,\n* values for which the predicate returns `false` are returned\n */\ninternal class FilteringSequence<T>(private val sequence: Sequence<T>,\n   private val sendWhen: Boolean = true,\n   private val predicate: (T) -> Boolean\n   ) : Sequence<T> {\n\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   val iterator = sequence.iterator()\n   var nextState: Int = -1 // -1 for unknown, 0 for done, 1 for continue\n   var nextItem: T? = null\n\n   private fun calcNext() {\n   while (iterator.hasNext()) {\n   val item = iterator.next()\n   if (predicate(item) == sendWhen) {\n   nextItem = item\n   nextState = 1\n   return\n   }\n   }\n   nextState = 0\n   }\n\n   override fun next(): T {\n   if (nextState == -1)\n   calcNext()\n   if (nextState == 0)\n   throw NoSuchElementException()\n   val result = nextItem\n   nextItem = null\n   nextState = -1\n   @Suppress(\"UNCHECKED_CAST\")\n   return result as T\n   }\n\n   override fun hasNext(): Boolean {\n   if (nextState == -1)\n   calcNext()\n   return nextState == 1\n   }\n   }\n}\n\n/**\n * A sequence which returns the results of applying the given [transformer] function to the values\n * in the underlying [sequence].\n */\n\ninternal class TransformingSequence<T, R>\nconstructor(private val sequence: Sequence<T>, private val transformer: (T) -> R) : Sequence<R> {\n   override fun iterator(): Iterator<R> = object : Iterator<R> {\n   val iterator = sequence.iterator()\n   override fun next(): R {\n   return transformer(iterator.next())\n   }\n\n   override fun hasNext(): Boolean {\n   return iterator.hasNext()\n   }\n   }\n\n   internal fun <E> flatten(iterator: (R) -> Iterator<E>): Sequence<E> {\n   return FlatteningSequence<T, R, E>(sequence, transformer, iterator)\n   }\n}\n\n/**\n * A sequence which returns the results of applying the given [transformer] function to the values\n * in the underlying [sequence], where the transformer function takes the index of the value in the underlying\n * sequence along with the value itself.\n */\ninternal class TransformingIndexedSequence<T, R>\nconstructor(private val sequence: Sequence<T>, private val transformer: (Int, T) -> R) : Sequence<R> {\n   override fun iterator(): Iterator<R> = object : Iterator<R> {\n   val iterator = sequence.iterator()\n   var index = 0\n   override fun next(): R {\n   return transformer(index++, iterator.next())\n   }\n\n   override fun hasNext(): Boolean {\n   return iterator.hasNext()\n   }\n   }\n}\n\n/**\n * A sequence which combines values from the underlying [sequence] with their indices and returns them as\n * [IndexedValue] objects.\n */\ninternal class IndexingSequence<T>\nconstructor(private val sequence: Sequence<T>) : Sequence<IndexedValue<T>> {\n   override fun iterator(): Iterator<IndexedValue<T>> = object : Iterator<IndexedValue<T>> {\n   val iterator = sequence.iterator()\n   var index = 0\n   override fun next(): IndexedValue<T> {\n   return IndexedValue(index++, iterator.next())\n   }\n\n   override fun hasNext(): Boolean {\n   return iterator.hasNext()\n   }\n   }\n}\n\n/**\n * A sequence which takes the values from two parallel underlying sequences, passes them to the given\n * [transform] function and returns the values returned by that function. The sequence stops returning\n * values as soon as one of the underlying sequences stops returning values.\n */\ninternal class MergingSequence<T1, T2, V>\n   constructor(private val sequence1: Sequence<T1>,\n   private val sequence2: Sequence<T2>,\n   private val transform: (T1, T2) -> V\n   ) : Sequence<V> {\n   override fun iterator(): Iterator<V> = object : Iterator<V> {\n   val iterator1 = sequence1.iterator()\n   val iterator2 = sequence2.iterator()\n   override fun next(): V {\n   return transform(iterator1.next(), iterator2.next())\n   }\n\n   override fun hasNext(): Boolean {\n   return iterator1.hasNext() && iterator2.hasNext()\n   }\n   }\n}\n\ninternal class FlatteningSequence<T, R, E>\n   constructor(\n   private val sequence: Sequence<T>,\n   private val transformer: (T) -> R,\n   private val iterator: (R) -> Iterator<E>\n   ) : Sequence<E> {\n   override fun iterator(): Iterator<E> = object : Iterator<E> {\n   val iterator = sequence.iterator()\n   var itemIterator: Iterator<E>? = null\n\n   override fun next(): E {\n   if (!ensureItemIterator())\n   throw

NoSuchElementException()\n   return itemIterator!!.next()\n   }\n\n   override fun hasNext(): Boolean {\n   return ensureItemIterator()\n   }\n\n   private fun ensureItemIterator(): Boolean {\n   if (itemIterator?.hasNext() == false)\n   itemIterator = null\n\n   while (itemIterator == null) {\n   if (!iterator.hasNext()) {\n   return false\n   } else {\n   val element = iterator.next()\n   val nextItemIterator = iterator(transformer(element))\n   if (nextItemIterator.hasNext()) {\n   itemIterator = nextItemIterator\n   return true\n   }\n   }\n   }\n   return true\n   }\n}\n\n/**\n * A sequence that supports drop(n) and take(n) operations\n */\ninternal interface DropTakeSequence<T> : Sequence<T> {\n   fun drop(n: Int): Sequence<T>\n   fun take(n: Int): Sequence<T>\n}\n\n/**\n * A sequence that skips [startIndex] values from the underlying [sequence]\n * and stops returning values right before [endIndex], i.e. stops at `endIndex - 1`\n */\ninternal class SubSequence<T> (\n   private val sequence: Sequence<T>,\n   private val startIndex: Int,\n   private val endIndex: Int\n): Sequence<T>, DropTakeSequence<T> {\n\n   init {\n   require(startIndex >= 0) { \"startIndex should be non-negative, but is $startIndex\" }\n   require(endIndex >= 0) { \"endIndex should be non-negative, but is $endIndex\" }\n   require(endIndex >= startIndex) { \"endIndex should be not less than startIndex, but was $endIndex < $startIndex\"}\n   }\n\n   private val count: Int get() = endIndex - startIndex\n\n   override fun drop(n: Int): Sequence<T> = if (n >= count) emptySequence() else SubSequence(sequence, startIndex + n, endIndex)\n   override fun take(n: Int): Sequence<T> = if (n >= count) this else SubSequence(sequence, startIndex, startIndex + n)\n\n   override fun iterator() = object : Iterator<T> {\n\n   val iterator = sequence.iterator()\n   var position = 0\n\n   // Shouldn't be called from constructor to avoid premature iteration\n   private fun drop() {\n   while(position < startIndex && iterator.hasNext()) {\n   iterator.next()\n   position++\n   }\n   }\n\n   override fun hasNext(): Boolean {\n   drop()\n   return (position < endIndex) && iterator.hasNext()\n   }\n\n   override fun next(): T {\n   drop()\n   if (position >= endIndex)\n   throw NoSuchElementException()\n   position++\n   return iterator.next()\n   }\n   }\n}\n\n/**\n * A sequence that returns at most [count] values from the underlying [sequence], and stops returning values\n * as soon as that count is reached.\n */\ninternal class TakeSequence<T> (\n   private val sequence: Sequence<T>,\n   private val count: Int\n) : Sequence<T>, DropTakeSequence<T> {\n\n   init {\n   require (count >= 0) { \"count must be non-negative, but was $count.\" }\n   }\n\n   override fun drop(n: Int): Sequence<T> = if (n >= count) emptySequence() else SubSequence(sequence, n, count)\n   override fun take(n: Int): Sequence<T> = if (n >= count) this else TakeSequence(sequence, n)\n\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   var left = count\n   val iterator = sequence.iterator()\n\n   override fun next(): T {\n   if (left == 0)\n   throw NoSuchElementException()\n   left--\n   return iterator.next()\n   }\n\n   override fun hasNext(): Boolean {\n   return left > 0 && iterator.hasNext()\n   }\n   }\n}\n\n/**\n * A sequence that returns values from the underlying [sequence] while the [predicate] function returns\n * `true`, and stops returning values once the function returns `false` for the next element.\n */\ninternal class TakeWhileSequence<T>\n   constructor(private val sequence: Sequence<T>,\n   private val predicate: (T) -> Boolean\n   ) : Sequence<T> {\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   val iterator = sequence.iterator()\n   var nextState: Int = -1 // -1 for unknown, 0 for done, 1 for continue\n   var nextItem: T? = null\n\n   private fun calcNext() {\n   if (iterator.hasNext()) {\n   val item = iterator.next()\n   if (predicate(item)) {\n   nextState = 1\n   nextItem = item\n   return\n   }\n   }\n   nextState = 0\n   }\n\n   override fun next(): T {\n   if (nextState == -1)\n   calcNext() // will change nextState\n   if (nextState == 0)\n   throw NoSuchElementException()\n   @Suppress(\"UNCHECKED_CAST\")\n   val result = nextItem as T\n\n   // Clean next to avoid keeping reference on yielded instance\n   nextItem = null\n   nextState = -1\n   return result\n   }\n\n   override fun hasNext(): Boolean {\n   if (nextState == -1)\n   calcNext() // will change nextState\n   return nextState == 1\n   }\n   }\n}\n\n/**\n * A sequence that skips the specified number of values from the underlying [sequence] and returns\n * all values after that.\n */\ninternal class DropSequence<T> (\n   private val sequence: Sequence<T>,\n   private val count: Int\n) : Sequence<T>, DropTakeSequence<T> {\n   init {\n   require (count >= 0) { \"count must be non-negative, but was $count.\"

}\n   }\n\n   override fun drop(n: Int): Sequence<T> = DropSequence(sequence, count + n)\n   override fun take(n: Int): Sequence<T> = SubSequence(sequence, count, count + n)\n\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   val iterator = sequence.iterator()\n   var left = count\n\n   // Shouldn't be called from constructor to avoid premature iteration\n   private fun drop() {\n   while (left > 0 && iterator.hasNext()) {\n   iterator.next()\n   left--\n   }\n   }\n   override fun next(): T {\n   drop()\n   return iterator.next()\n   }\n\n   override fun hasNext(): Boolean {\n   drop()\n   return iterator.hasNext()\n   }\n   }\n}\n\n/**\n * A sequence that skips the values from the underlying [sequence] while the given [predicate] returns `true` and returns\n * all values after that.\n */\ninternal class DropWhileSequence<T>\n   constructor(private val sequence: Sequence<T>,\n private val predicate: (T) -> Boolean\n   ) : Sequence<T> {\n\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   val iterator = sequence.iterator()\n   var dropState: Int = -1 // -1 for not dropping, 1 for nextItem, 0 for normal iteration\n   var nextItem: T? = null\n\n   private fun drop() {\n   while (iterator.hasNext()) {\n   val item = iterator.next()\n   if (!predicate(item)) {\n   nextItem = item\n   dropState = 1\n   return\n   }\n   }\n   dropState = 0\n   }\n\n   override fun next(): T {\n   if (dropState == -1)\n   drop()\n\n   if (dropState == 1) {\n   @Suppress(\"UNCHECKED_CAST\")\n   val result = nextItem as T\n   nextItem = null\n   dropState = 0\n   return result\n   }\n   return iterator.next()\n   }\n\n   override fun hasNext(): Boolean {\n   if (dropState == -1)\n   drop()\n   return dropState == 1 || iterator.hasNext()\n   }\n   }\n}\n\ninternal class DistinctSequence<T, K>(private val source : Sequence<T>, private val keySelector : (T) -> K) : Sequence<T> {\n   override fun iterator(): Iterator<T> = DistinctIterator(source.iterator(), keySelector)\n}\n\nprivate class DistinctIterator<T, K>(private val source : Iterator<T>, private val keySelector : (T) -> K) : AbstractIterator<T>() {\n   private val observed = HashSet<K>()\n\n   override fun computeNext() {\n   while (source.hasNext()) {\n   val next = source.next()\n   val key = keySelector(next)\n\n   if (observed.add(key)) {\n   setNext(next)\n   return\n   }\n   }\n   done()\n   }\n}\n\nprivate class GeneratorSequence<T: Any>(private val getInitialValue: () -> T?, private val getNextValue: (T) -> T?): Sequence<T> {\n   override fun iterator(): Iterator<T> = object : Iterator<T> {\n   var nextItem: T? = null\n   var nextState: Int = -2 // -2 for initial unknown, -1 for next unknown, 0 for done, 1 for continue\n\n   private fun calcNext() {\n   nextItem = if (nextState == -2) getInitialValue() else getNextValue(nextItem!!)\n   nextState = if (nextItem == null) 0 else 1\n   }\n\n   override fun next(): T {\n   if (nextState < 0)\n   calcNext()\n\n   if (nextState == 0)\n   throw NoSuchElementException()\n   val result = nextItem as T\n   // Do not clean nextItem (to avoid keeping reference on yielded instance) -- need to keep state for getNextValue\n   nextState = -1\n   return result\n   }\n\n   override fun hasNext(): Boolean {\n   if (nextState < 0)\n   calcNext()\n   return nextState == 1\n   }\n   }\n}\n\n/**\n * Returns a wrapper sequence that provides values of this sequence, but ensures it can be iterated only one time.\n *\n * The operation is _intermediate_ and _stateless_.\n *\n * [IllegalStateException] is thrown on iterating the returned sequence from the second time.\n *\n */\npublic fun <T> Sequence<T>.constrainOnce(): Sequence<T> {\n   // as? does not work in js\n   //return this as? ConstrainedOnceSequence<T> ?: ConstrainedOnceSequence(this)\n   return if (this is ConstrainedOnceSequence<T>) this else ConstrainedOnceSequence(this)\n}\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n/**\n * Returns a sequence which invokes the function to calculate the next value on each iteration until the function returns `null`.\n *\n * The returned sequence is constrained to be iterated only once.\n *\n * @see constrainOnce\n * @see kotlin.coroutines.experimental.buildSequence\n *\n * @sample samples.collections.Sequences.Building.generateSequence\n */\npublic fun <T : Any> generateSequence(nextFunction: () -> T?): Sequence<T> {\n   return GeneratorSequence(nextFunction, { nextFunction() }).constrainOnce()\n}\n\n/**\n * Returns a sequence defined by the starting value [seed] and the function [nextFunction],\n * which is invoked to calculate the next value based on the previous one on each iteration.\n *\n * The sequence produces values until it encounters first `null` value.\n * If [seed] is `null`, an empty sequence is produced.\n *\n * The sequence can be iterated multiple times, each time starting with [seed].\n *\n *

@see kotlin.coroutines.experimental.buildSequence\n *\n * @sample samples.collections.Sequences.Building.generateSequenceWithSeed\n *\n@kotlin.internal.LowPriorityInOverloadResolution\npublic fun <T : Any> generateSequence(seed: T?, nextFunction: (T) -> T?): Sequence<T> =\n   if (seed == null)\n   EmptySequence\n   else\n   GeneratorSequence({ seed }, nextFunction)\n\n/**\n * Returns a sequence defined by the function [seedFunction], which is invoked to produce the starting value,\n * and the [nextFunction], which is invoked to calculate the next value based on the previous one on each iteration.\n *\n * The sequence produces values until it encounters first `null` value.\n * If [seedFunction] returns `null`, an empty sequence is produced.\n *\n * The sequence can be iterated multiple times.\n *\n * @see kotlin.coroutines.experimental.buildSequence\n *\n * @sample samples.collections.Sequences.Building.generateSequenceWithLazySeed\n */\npublic fun <T: Any> generateSequence(seedFunction: () -> T?, nextFunction: (T) -> T?): Sequence<T> =\n   GeneratorSequence(seedFunction, nextFunction)\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\n\npackage kotlin.collections\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Returns 1st *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> List<T>.component1(): T {\n   return get(0)\n}\n\n/**\n * Returns 2nd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> List<T>.component2(): T {\n   return get(1)\n}\n\n/**\n * Returns 3rd *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> List<T>.component3(): T {\n   return get(2)\n}\n\n/**\n * Returns 4th *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> List<T>.component4(): T {\n   return get(3)\n}\n\n/**\n * Returns 5th *element* from the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> List<T>.component5(): T {\n   return get(4)\n}\n\n/**\n * Returns `true` if [element] is found in the collection.\n */\npublic operator fun <@kotlin.internal.OnlyInputTypes T> Iterable<T>.contains(element: T): Boolean {\n   if (this is Collection)\n   return contains(element)\n   return indexOf(element) >= 0\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this collection.\n */\npublic fun <T> Iterable<T>.elementAt(index: Int): T {\n   if (this is List)\n   return get(index)\n   return elementAtOrElse(index) { throw IndexOutOfBoundsException(\"Collection doesn't contain element at index $index.\") }\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this list.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>.elementAt(index: Int): T {\n   return get(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this collection.\n */\npublic fun <T> Iterable<T>.elementAtOrElse(index: Int, defaultValue: (Int) -> T): T {\n   if (this is List)\n   return this.getOrElse(index, defaultValue)\n   if (index < 0)\n   return defaultValue(index)\n   val iterator = iterator()\n   var count = 0\n   while (iterator.hasNext()) {\n   val element = iterator.next()\n   if (index == count++)\n   return element\n   }\n   return defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this list.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>.elementAtOrElse(index: Int, defaultValue: (Int) -> T): T {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this collection.\n */\npublic fun <T> Iterable<T>.elementAtOrNull(index: Int): T? {\n   if (this is List)\n   return this.getOrNull(index)\n   if (index < 0)\n   return null\n   val iterator = iterator()\n   var count = 0\n   while (iterator.hasNext()) {\n   val element = iterator.next()\n   if (index == count++)\n   return element\n   }\n   return null\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this list.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>.elementAtOrNull(index: Int): T? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable<T>.find(predicate: (T) ->

Boolean): T? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable<T>.findLast(predicate: (T) -> Boolean): T? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>.findLast(predicate: (T) -> Boolean): T? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the collection is empty.\n */\npublic fun <T> Iterable<T>.first(): T {\n   when (this) {\n   is List -> return this.first()\n   else -> {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Collection is empty.\")\n   return iterator.next()\n   }\n   }\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the list is empty.\n */\npublic fun <T> List<T>.first(): T {\n   if (isEmpty())\n   throw NoSuchElementException(\"List is empty.\")\n   return this[0]\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun <T> Iterable<T>.first(predicate: (T) -> Boolean): T {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Collection contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element, or `null` if the collection is empty.\n */\npublic fun <T> Iterable<T>.firstOrNull(): T? {\n   when (this) {\n   is List -> {\n   if (isEmpty())\n   return null\n   else\n   return this[0]\n   }\n   else -> {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   return iterator.next()\n   }\n   }\n}\n\n/**\n * Returns the first element, or `null` if the list is empty.\n */\npublic fun <T> List<T>.firstOrNull(): T? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n */\npublic inline fun <T> Iterable<T>.firstOrNull(predicate: (T) -> Boolean): T? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this list.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> List<T>.getOrElse(index: Int, defaultValue: (Int) -> T): T {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this list.\n */\npublic fun <T> List<T>.getOrNull(index: Int): T? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns first index of [element], or -1 if the collection does not contain element.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Iterable<T>.indexOf(element: T): Int {\n   if (this is List) return this.indexOf(element)\n   var index = 0\n   for (item in this) {\n   if (element == item)\n   return index\n   index++\n   }\n   return -1\n}\n\n/**\n * Returns first index of [element], or -1 if the list does not contain element.\n */\n@Suppress(\"EXTENSION_SHADOWED_BY_MEMBER\") // false warning, extension takes precedence in some cases\npublic fun <@kotlin.internal.OnlyInputTypes T> List<T>.indexOf(element: T): Int {\n   return indexOf(element)\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the collection does not contain such element.\n */\npublic inline fun <T> Iterable<T>.indexOfFirst(predicate: (T) -> Boolean): Int {\n   var index = 0\n   for (item in this) {\n   if (predicate(item))\n   return index\n   index++\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the list does not contain such element.\n */\npublic inline fun <T> List<T>.indexOfFirst(predicate: (T) -> Boolean): Int {\n   var index = 0\n   for (item in this) {\n   if (predicate(item))\n   return index\n   index++\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the collection does not contain such element.\n */\npublic inline fun <T> Iterable<T>.indexOfLast(predicate: (T) -> Boolean): Int {\n   var lastIndex = -1\n   var index = 0\n   for (item in this) {\n   if (predicate(item))\n   lastIndex = index\n   index++\n   }\n   return lastIndex\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the list does not contain such element.\n */\npublic inline fun <T> List<T>.indexOfLast(predicate: (T) -> Boolean): Int {\n   val iterator = this.listIterator(size)\n   while (iterator.hasPrevious()) {\n   if (predicate(iterator.previous())) {\n   return iterator.nextIndex()\n   }\n   }\n   return -1\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the collection is empty.\n */\npublic fun <T> Iterable<T>.last(): T {\n   when (this)

{\n   is List -> return this.last()\n   else -> {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Collection is empty.\")\n   var last = iterator.next()\n   while (iterator.hasNext())\n   last = iterator.next()\n   return last\n   }\n   }\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the list is empty.\n */\npublic fun <T> List<T>.last(): T {\n   if (isEmpty())\n   throw NoSuchElementException(\"List is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun <T> Iterable<T>.last(predicate: (T) -> Boolean): T {\n   var last: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   last = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Collection contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return last as T\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n */\npublic inline fun <T> List<T>.last(predicate: (T) -> Boolean): T {\n   val iterator = this.listIterator(size)\n   while (iterator.hasPrevious()) {\n   val element = iterator.previous()\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"List contains no element matching the predicate.\")\n}\n\n/**\n * Returns last index of [element], or -1 if the collection does not contain element.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Iterable<T>.lastIndexOf(element: T): Int {\n   if (this is List) return this.lastIndexOf(element)\n   var lastIndex = -1\n   var index = 0\n   for (item in this) {\n   if (element == item)\n   lastIndex = index\n   index++\n   }\n   return lastIndex\n}\n\n/**\n * Returns last index of [element], or -1 if the list does not contain element.\n */\n@Suppress(\"EXTENSION_SHADOWED_BY_MEMBER\") // false warning, extension takes precedence in some cases\npublic fun <@kotlin.internal.OnlyInputTypes T> List<T>.lastIndexOf(element: T): Int {\n   return lastIndexOf(element)\n}\n\n/**\n * Returns the last element, or `null` if the collection is empty.\n */\npublic fun <T> Iterable<T>.lastOrNull(): T? {\n   when (this) {\n   is List -> return if (isEmpty()) null else this[size - 1]\n   else -> {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   var last = iterator.next()\n   while (iterator.hasNext())\n   last = iterator.next()\n   return last\n   }\n   }\n}\n\n/**\n * Returns the last element, or `null` if the list is empty.\n */\npublic fun <T> List<T>.lastOrNull(): T? {\n   return if (isEmpty()) null else this[size - 1]\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun <T> Iterable<T>.lastOrNull(predicate: (T) -> Boolean): T? {\n   var last: T? = null\n   for (element in this) {\n   if (predicate(element)) {\n   last = element\n   }\n   }\n   return last\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n */\npublic inline fun <T> List<T>.lastOrNull(predicate: (T) -> Boolean): T? {\n   val iterator = this.listIterator(size)\n   while (iterator.hasPrevious()) {\n   val element = iterator.previous()\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the single element, or throws an exception if the collection is empty or has more than one element.\n */\npublic fun <T> Iterable<T>.single(): T {\n   when (this) {\n   is List -> return this.single()\n   else -> {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Collection is empty.\")\n   val single = iterator.next()\n   if (iterator.hasNext())\n   throw IllegalArgumentException(\"Collection has more than one element.\")\n   return single\n   }\n   }\n}\n\n/**\n * Returns the single element, or throws an exception if the list is empty or has more than one element.\n */\npublic fun <T> List<T>.single(): T {\n   return when (size) {\n   0 -> throw NoSuchElementException(\"List is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"List has more than one element.\")\n   }\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n */\npublic inline fun <T> Iterable<T>.single(predicate: (T) -> Boolean): T {\n   var single: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Collection contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Collection contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as T\n}\n\n/**\n * Returns single element, or `null` if the collection is empty or has more than one element.\n */\npublic fun <T>

Iterable<T>.singleOrNull(): T? {\n   when (this) {\n   is List -> return if (size == 1) this[0] else null\n   else ->
{\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   val single =
iterator.next()\n   if (iterator.hasNext())\n   return null\n   return single\n   }\n   }\n}\n\n/**\n
* Returns single element, or `null` if the list is empty or has more than one element.\n */\npublic fun <T>
List<T>.singleOrNull(): T? {\n   return if (size == 1) this[0] else null\n}\n\n/**\n * Returns the single element
matching the given [predicate], or `null` if element was not found or more than one element was found.\n */\npublic
inline fun <T> Iterable<T>.singleOrNull(predicate: (T) -> Boolean): T? {\n   var single: T? = null\n   var found =
false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single =
element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns a list
containing all elements except first [n] elements.\n * \n * @sample
samples.collections.Collections.Transformations.drop\n */\npublic fun <T> Iterable<T>.drop(n: Int): List<T> {\n
require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return toList()\n   val list:
ArrayList<T>\n   if (this is Collection<*>) {\n   val resultSize = size - n\n   if (resultSize <= 0)\n   return
emptyList()\n   if (resultSize == 1)\n   return listOf(last())\n   list = ArrayList<T>(resultSize)\n   if
(this is List<T>) {\n   if (this is RandomAccess) {\n   for (index in n until size)\n
list.add(this[index])\n   } else {\n   for (item in listIterator(n))\n   list.add(item)\n   }\n
        return list\n   }\n   }\n   else {\n   list = ArrayList<T>()\n   }\n   var count = 0\n   for (item in this) {\n
    if (count++ >= n) list.add(item)\n   }\n   return list.optimizeReadOnlyList()\n}\n\n/**\n * Returns a list
containing all elements except last [n] elements.\n * \n * @sample
samples.collections.Collections.Transformations.drop\n */\npublic fun <T> List<T>.dropLast(n: Int): List<T> {\n
require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return take((size -
n).coerceAtLeast(0))\n}\n\n/**\n * Returns a list containing all elements except last elements that satisfy the given
[predicate].\n * \n * @sample samples.collections.Collections.Transformations.drop\n */\npublic inline fun <T>
List<T>.dropLastWhile(predicate: (T) -> Boolean): List<T> {\n   if (!isEmpty()) {\n   val iterator =
listIterator(size)\n   while (iterator.hasPrevious()) {\n   if (!predicate(iterator.previous())) {\n   return
take(iterator.nextIndex() + 1)\n   }\n   }\n   }\n   return emptyList()\n}\n\n/**\n * Returns a list containing
all elements except first elements that satisfy the given [predicate].\n * \n * @sample
samples.collections.Collections.Transformations.drop\n */\npublic inline fun <T> Iterable<T>.dropWhile(predicate:
(T) -> Boolean): List<T> {\n   var yielding = false\n   val list = ArrayList<T>()\n   for (item in this)\n   if
(yielding)\n   list.add(item)\n   else if (!predicate(item)) {\n   list.add(item)\n   yielding = true\n
  }\n   return list\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n */\npublic
inline fun <T> Iterable<T>.filter(predicate: (T) -> Boolean): List<T> {\n   return filterTo(ArrayList<T>(),
predicate)\n}\n\n/**\n * Returns a list containing only elements matching the given [predicate].\n * @param
[predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate
evaluation on the element.\n */\npublic inline fun <T> Iterable<T>.filterIndexed(predicate: (index: Int, T) ->
Boolean): List<T> {\n   return filterIndexedTo(ArrayList<T>(), predicate)\n}\n\n/**\n * Appends all elements
matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an
element and the element itself\n * and returns the result of predicate evaluation on the element.\n */\npublic inline
fun <T, C : MutableCollection<in T>> Iterable<T>.filterIndexedTo(destination: C, predicate: (index: Int, T) ->
Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element))
destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Returns a list containing all elements that are
instances of specified type parameter R.\n */\npublic inline fun <reified R> Iterable<*>.filterIsInstance():
List<@kotlin.internal.NoInfer R> {\n   return filterIsInstanceTo(ArrayList<R>())\n}\n\n/**\n * Appends all
elements that are instances of specified type parameter R to the given [destination].\n */\npublic inline fun <reified
R, C : MutableCollection<in R>> Iterable<*>.filterIsInstanceTo(destination: C): C {\n   for (element in this) if
(element is R) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a list containing all elements
not matching the given [predicate].\n */\npublic inline fun <T> Iterable<T>.filterNot(predicate: (T) -> Boolean):
List<T> {\n   return filterNotTo(ArrayList<T>(), predicate)\n}\n\n/**\n * Returns a list containing all elements that

are not `null`.\n */\npublic fun <T : Any> Iterable<T?>.filterNotNull(): List<T> {\n   return filterNotNullTo(ArrayList<T>())\n}\n\n/**\n * Appends all elements that are not `null` to the given [destination].\n */\npublic fun <C : MutableCollection<in T>, T : Any> Iterable<T?>.filterNotNullTo(destination: C): C {\n   for (element in this) if (element != null) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n */\npublic inline fun <T, C : MutableCollection<in T>> Iterable<T>.filterNotTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n */\npublic inline fun <T, C : MutableCollection<in T>> Iterable<T>.filterTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a list containing elements at indices in the specified [indices] range.\n */\npublic fun <T> List<T>.slice(indices: IntRange): List<T> {\n   if (indices.isEmpty()) return listOf()\n   return this.subList(indices.start, indices.endInclusive + 1).toList()\n}\n\n/**\n * Returns a list containing elements at specified [indices].\n */\npublic fun <T> List<T>.slice(indices: Iterable<Int>): List<T> {\n   val size = indices.collectionSizeOrDefault(10)\n   if (size == 0) return emptyList()\n   val list = ArrayList<T>(size)\n   for (index in indices) {\n   list.add(get(index))\n   }\n   return list\n}\n\n/**\n * Returns a list containing first [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun <T> Iterable<T>.take(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   if (this is Collection<T>) {\n   if (n >= size) return toList()\n   if (n == 1) return listOf(first())\n   }\n   var count = 0\n   val list = ArrayList<T>(n)\n   for (item in this) {\n   if (count++ == n)\n   break\n   list.add(item)\n   }\n   return list.optimizeReadOnlyList()\n}\n\n/**\n * Returns a list containing last [n] elements.\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic fun <T> List<T>.takeLast(n: Int): List<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   if (n == 0) return emptyList()\n   val size = size\n   if (n >= size) return toList()\n   if (n == 1) return listOf(last())\n   val list = ArrayList<T>(n)\n   if (this is RandomAccess) {\n   for (index in size - n until size)\n   list.add(this[index])\n   } else {\n   for (item in listIterator(size - n))\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Returns a list containing last elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun <T> List<T>.takeLastWhile(predicate: (T) -> Boolean): List<T> {\n   if (isEmpty())\n   return emptyList()\n   val iterator = listIterator(size)\n   while (iterator.hasPrevious()) {\n   if (!predicate(iterator.previous())) {\n   iterator.next()\n   val expectedSize = size - iterator.nextIndex()\n   if (expectedSize == 0) return emptyList()\n   return ArrayList<T>(expectedSize).apply {\n   while (iterator.hasNext())\n   add(iterator.next())\n   }\n   }\n   }\n   return toList()\n}\n\n/**\n * Returns a list containing first elements satisfying the given [predicate].\n * \n * @sample samples.collections.Collections.Transformations.take\n */\npublic inline fun <T> Iterable<T>.takeWhile(predicate: (T) -> Boolean): List<T> {\n   val list = ArrayList<T>()\n   for (item in this) {\n   if (!predicate(item))\n   break\n   list.add(item)\n   }\n   return list\n}\n\n/**\n * Reverses elements in the list in-place.\n */\npublic fun <T> MutableList<T>.reverse(): Unit {\n   val midPoint = (size / 2) - 1\n   if (midPoint < 0) return\n   var reverseIndex = lastIndex\n   for (index in 0..midPoint) {\n   val tmp = this[index]\n   this[index] = this[reverseIndex]\n   this[reverseIndex] = tmp\n   reverseIndex--\n   }\n}\n\n/**\n * Returns a list with elements in reversed order.\n */\npublic fun <T> Iterable<T>.reversed(): List<T> {\n   if (this is Collection && size <= 1) return toList()\n   val list = toMutableList()\n   list.reverse()\n   return list\n}\n\n/**\n * Sorts elements in the list in-place according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> MutableList<T>.sortBy(crossinline selector: (T) -> R?): Unit {\n   if (size > 1) sortWith(compareBy(selector))\n}\n\n/**\n * Sorts elements in the list in-place descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> MutableList<T>.sortByDescending(crossinline selector: (T) -> R?): Unit {\n   if (size > 1) sortWith(compareByDescending(selector))\n}\n\n/**\n * Sorts elements in the list in-place descending according to their natural sort order.\n */\npublic fun <T : Comparable<T>> MutableList<T>.sortDescending(): Unit {\n

sortWith(reverseOrder()))\n}\n\n/**\n * Returns a list of all elements sorted according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Iterable<T>.sorted(): List<T> {\n   if (this is Collection) {\n   if (size <= 1) return this.toList()\n   @Suppress(\"UNCHECKED_CAST\")\n   return (toTypedArray<Comparable<T>>() as Array<T>).apply { sort() }.asList()\n   }\n   return toMutableList().apply { sort() }\n}\n\n/**\n * Returns a list of all elements sorted according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> Iterable<T>.sortedBy(crossinline selector: (T) -> R?): List<T> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to natural sort order of the value returned by specified [selector] function.\n */\npublic inline fun <T, R : Comparable<R>> Iterable<T>.sortedByDescending(crossinline selector: (T) -> R?): List<T> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a list of all elements sorted descending according to their natural sort order.\n */\npublic fun <T : Comparable<T>> Iterable<T>.sortedDescending(): List<T> {\n   return sortedWith(reverseOrder())\n}\n\n/**\n * Returns a list of all elements sorted according to the specified [comparator].\n */\npublic fun <T> Iterable<T>.sortedWith(comparator: Comparator<in T>): List<T> {\n   if (this is Collection) {\n   if (size <= 1) return this.toList()\n   @Suppress(\"UNCHECKED_CAST\")\n   return (toTypedArray<Any?>() as Array<T>).apply { sortWith(comparator) }.asList()\n   }\n   return toMutableList().apply { sortWith(comparator) }\n}\n\n/**\n * Returns an array of Boolean containing all of the elements of this collection.\n */\npublic fun Collection<Boolean>.toBooleanArray(): BooleanArray {\n   val result = BooleanArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Byte containing all of the elements of this collection.\n */\npublic fun Collection<Byte>.toByteArray(): ByteArray {\n   val result = ByteArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Char containing all of the elements of this collection.\n */\npublic fun Collection<Char>.toCharArray(): CharArray {\n   val result = CharArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Double containing all of the elements of this collection.\n */\npublic fun Collection<Double>.toDoubleArray(): DoubleArray {\n   val result = DoubleArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Float containing all of the elements of this collection.\n */\npublic fun Collection<Float>.toFloatArray(): FloatArray {\n   val result = FloatArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Int containing all of the elements of this collection.\n */\npublic fun Collection<Int>.toIntArray(): IntArray {\n   val result = IntArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Long containing all of the elements of this collection.\n */\npublic fun Collection<Long>.toLongArray(): LongArray {\n   val result = LongArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns an array of Short containing all of the elements of this collection.\n */\npublic fun Collection<Short>.toShortArray(): ShortArray {\n   val result = ShortArray(size)\n   var index = 0\n   for (element in this)\n   result[index++] = element\n   return result\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given collection.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original collection.\n */\npublic inline fun <T, K, V> Iterable<T>.associate(transform: (T) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(collectionSizeOrDefault(10)).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing the elements from the given collection indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original collection.\n */\npublic inline fun <T, K> Iterable<T>.associateBy(keySelector: (T) -> K): Map<K, T> {\n   val capacity = mapCapacity(collectionSizeOrDefault(10)).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, T>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given collection.\n * \n * If any two elements would

have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original collection.\n */\npublic inline fun <T, K, V> Iterable<T>.associateBy(keySelector: (T) -> K, valueTransform: (T) -> V): Map<K, V> {\n   val capacity = mapCapacity(collectionSizeOrDefault(10)).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each element of the given collection\n * and value is the element itself.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <T, K, M : MutableMap<in K, in T>> Iterable<T>.associateByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and value is provided by the [valueTransform] function applied to elements of the given collection.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <T, K, V, M : MutableMap<in K, in V>> Iterable<T>.associateByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each element of the given collection.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <T, K, V, M : MutableMap<in K, in V>> Iterable<T>.associateTo(destination: M, transform: (T) -> Pair<K, V>): M {\n   for (element in this) {\n   destination += transform(element)\n   }\n   return destination\n}\n\n/**\n * Appends all elements to the given [destination] collection.\n */\npublic fun <T, C : MutableCollection<in T>> Iterable<T>.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Returns a [HashSet] of all elements.\n */\npublic fun <T> Iterable<T>.toHashSet(): HashSet<T> {\n   return toCollection(HashSet<T>(mapCapacity(collectionSizeOrDefault(12))))\n}\n\n/**\n * Returns a [List] containing all elements.\n */\npublic fun <T> Iterable<T>.toList(): List<T> {\n   if (this is Collection) {\n   return when (size) {\n   0 -> emptyList()\n   1 -> listOf(if (this is List) get(0) else iterator().next())\n   else -> this.toMutableList()\n   }\n   }\n   return this.toMutableList().optimizeReadOnlyList()\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this collection.\n */\npublic fun <T> Iterable<T>.toMutableList(): MutableList<T> {\n   if (this is Collection<T>)\n   return this.toMutableList()\n   return toCollection(ArrayList<T>())\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this collection.\n */\npublic fun <T> Collection<T>.toMutableList(): MutableList<T> {\n   return ArrayList(this)\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set preserves the element iteration order of the original collection.\n */\npublic fun <T> Iterable<T>.toSet(): Set<T> {\n   if (this is Collection) {\n   return when (size) {\n   0 -> emptySet()\n   1 -> setOf(if (this is List) this[0] else iterator().next())\n   else -> toCollection(LinkedHashSet<T>(mapCapacity(size)))\n   }\n   }\n   return toCollection(LinkedHashSet<T>()).optimizeReadOnlySet()\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each element of original collection.\n */\npublic inline fun <T, R> Iterable<T>.flatMap(transform: (T) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each element of original collection, to the given [destination].\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Iterable<T>.flatMapTo(destination: C, transform: (T) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Groups elements of the original collection by the key returned by the given [keySelector] function\n * applied to each element and returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original collection.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <T, K> Iterable<T>.groupBy(keySelector: (T) -> K): Map<K, List<T>> {\n   return groupByTo(LinkedHashMap<K, MutableList<T>>(), keySelector)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to

each element of the original collection\n * by the key returned by the given [keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original collection.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <T, K, V> Iterable<T>.groupBy(keySelector: (T) -> K, valueTransform: (T) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups elements of the original collection by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <T, K, M : MutableMap<in K, MutableList<T>>> Iterable<T>.groupByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<T>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original collection\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <T, K, V, M : MutableMap<in K, MutableList<V>>> Iterable<T>.groupByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Creates a [Grouping] source from a collection to be used later with one of group-and-fold operations\n * using the specified [keySelector] function to extract a key from each element.\n * \n * @sample samples.collections.Collections.Transformations.groupingByEachCount\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K> Iterable<T>.groupingBy(crossinline keySelector: (T) -> K): Grouping<T, K> {\n   return object : Grouping<T, K> {\n   override fun sourceIterator(): Iterator<T> = this@groupingBy.iterator()\n   override fun keyOf(element: T): K = keySelector(element)\n   }\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element in the original collection.\n */\npublic inline fun <T, R> Iterable<T>.map(transform: (T) -> R): List<R> {\n   return mapTo(ArrayList<R>(collectionSizeOrDefault(10)), transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each element and its index in the original collection.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R> Iterable<T>.mapIndexed(transform: (index: Int, T) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(collectionSizeOrDefault(10)), transform)\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each element and its index in the original collection.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R : Any> Iterable<T>.mapIndexedNotNull(transform: (index: Int, T) -> R?): List<R> {\n   return mapIndexedNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original collection\n * and appends only the non-null results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Iterable<T>.mapIndexedNotNullTo(destination: C, transform: (index: Int, T) -> R?): C {\n   forEachIndexed { index, element -> transform(index, element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original collection\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Iterable<T>.mapIndexedTo(destination: C, transform: (index: Int, T) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each element in

the original collection.\n */\npublic inline fun <T, R : Any> Iterable<T>.mapNotNull(transform: (T) -> R?): List<R> {\n   return mapNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each element in the original collection\n * and appends only the non-null results to the given [destination].\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Iterable<T>.mapNotNullTo(destination: C, transform: (T) -> R?): C {\n   forEach { element -> transform(element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original collection\n * and appends the results to the given [destination].\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Iterable<T>.mapTo(destination: C, transform: (T) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each element of the original collection.\n */\npublic fun <T> Iterable<T>.withIndex(): Iterable<IndexedValue<T>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns a list containing only distinct elements from the given collection.\n * \n * The elements in the resulting list are in the same order as they were in the source collection.\n */\npublic fun <T> Iterable<T>.distinct(): List<T> {\n   return this.toMutableSet().toList()\n}\n\n/**\n * Returns a list containing only elements from the given collection\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting list are in the same order as they were in the source collection.\n */\npublic inline fun <T, K> Iterable<T>.distinctBy(selector: (T) -> K): List<T> {\n   val set = HashSet<K>()\n   val list = ArrayList<T>()\n   for (e in this) {\n   val key = selector(e)\n   if (set.add(key))\n   list.add(e)\n   }\n   return list\n}\n\n/**\n * Returns a set containing all elements that are contained by both this set and the specified collection.\n * \n * The returned set preserves the element iteration order of the original collection.\n */\npublic infix fun <T> Iterable<T>.intersect(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.retainAll(other)\n   return set\n}\n\n/**\n * Returns a set containing all elements that are contained by this collection and not contained by the specified collection.\n * \n * The returned set preserves the element iteration order of the original collection.\n */\npublic infix fun <T> Iterable<T>.subtract(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.removeAll(other)\n   return set\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given collection.\n * \n * The returned set preserves the element iteration order of the original collection.\n */\npublic fun <T> Iterable<T>.toMutableSet(): MutableSet<T> {\n   return when (this) {\n   is Collection<T> -> LinkedHashSet(this)\n   else -> toCollection(LinkedHashSet<T>())\n   }\n}\n\n/**\n * Returns a set containing all distinct elements from both collections.\n * \n * The returned set preserves the element iteration order of the original collection.\n * Those elements of the [other] collection that are unique are iterated in the end\n * in the order of the [other] collection.\n */\npublic infix fun <T> Iterable<T>.union(other: Iterable<T>): Set<T> {\n   val set = this.toMutableSet()\n   set.addAll(other)\n   return set\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun <T> Iterable<T>.all(predicate: (T) -> Boolean): Boolean {\n   if (this is Collection && isEmpty()) return true\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if collection has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun <T> Iterable<T>.any(): Boolean {\n   if (this is Collection) return !isEmpty()\n   return iterator().hasNext()\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n */\npublic inline fun <T> Iterable<T>.any(predicate: (T) -> Boolean): Boolean {\n   if (this is Collection && isEmpty()) return false\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns the number of elements in this collection.\n */\npublic fun <T> Iterable<T>.count(): Int {\n   if (this is Collection) return size\n   var count = 0\n   for (element in this) count++\n   return count\n}\n\n/**\n * Returns the number of elements in this collection.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Collection<T>.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n */\npublic inline fun <T> Iterable<T>.count(predicate: (T) -> Boolean): Int {\n   if (this is Collection && isEmpty()) return 0\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n

*/\npublic inline fun <T, R> Iterable<T>.fold(initial: R, operation: (acc: R, T) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original collection.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n */\npublic inline fun <T, R> Iterable<T>.foldIndexed(initial: R, operation: (index: Int, acc: R, T) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun <T, R> List<T>.foldRight(initial: R, operation: (T, acc: R) -> R): R {\n   var accumulator = initial\n   if (!isEmpty()) {\n   val iterator = listIterator(size)\n   while (iterator.hasPrevious()) {\n   accumulator = operation(iterator.previous(), accumulator)\n   }\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each element with its index in the original list and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <T, R> List<T>.foldRightIndexed(initial: R, operation: (index: Int, T, acc: R) -> R): R {\n   var accumulator = initial\n   if (!isEmpty()) {\n   val iterator = listIterator(size)\n   while (iterator.hasPrevious()) {\n   val index = iterator.previousIndex()\n   accumulator = operation(index, iterator.previous(), accumulator)\n   }\n   }\n   return accumulator\n}\n\n/**\n * Performs the given [action] on each element.\n */\n@kotlin.internal.HidesMembers\npublic inline fun <T> Iterable<T>.forEach(action: (T) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n */\npublic inline fun <T> Iterable<T>.forEachIndexed(action: (index: Int, T) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Iterable<Double>.max(): Double? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   if (max.isNaN()) return max\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Iterable<Float>.max(): Float? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   if (max.isNaN()) return max\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n */\npublic fun <T : Comparable<T>> Iterable<T>.max(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n */\npublic inline fun <T, R : Comparable<R>> Iterable<T>.maxBy(selector: (T) -> R): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var maxElem = iterator.next()\n   var maxValue = selector(maxElem)\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun <T> Iterable<T>.maxWith(comparator: Comparator<in T>): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Iterable<Double>.min(): Double? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   if (min.isNaN()) return min\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n

return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n */\n@SinceKotlin(\"1.1\")\npublic fun Iterable<Float>.min(): Float? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   if (min.isNaN()) return min\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n */\npublic fun <T : Comparable<T>> Iterable<T>.min(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n */\npublic inline fun <T, R : Comparable<R>> Iterable<T>.minBy(selector: (T) -> R): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var minElem = iterator.next()\n   var minValue = selector(minElem)\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n */\npublic fun <T> Iterable<T>.minWith(comparator: Comparator<in T>): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns `true` if the collection has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun <T> Iterable<T>.none(): Boolean {\n   if (this is Collection) return isEmpty()\n   return !iterator().hasNext()\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun <T> Iterable<T>.none(predicate: (T) -> Boolean): Boolean {\n   if (this is Collection && isEmpty()) return true\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Performs the given [action] on each element and returns the collection itself afterwards.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, C : Iterable<T>> C.onEach(action: (T) -> Unit): C {\n   return apply { for (element in this) action(element) }\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n */\npublic inline fun <S, T: S> Iterable<T>.reduce(operation: (acc: S, T) -> S): S {\n   val iterator = this.iterator()\n   if (!iterator.hasNext()) throw UnsupportedOperationException(\"Empty collection can't be reduced.\")\n   var accumulator: S = iterator.next()\n   while (iterator.hasNext()) {\n   accumulator = operation(accumulator, iterator.next())\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original collection.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n */\npublic inline fun <S, T: S> Iterable<T>.reduceIndexed(operation: (index: Int, acc: S, T) -> S): S {\n   val iterator = this.iterator()\n   if (!iterator.hasNext()) throw UnsupportedOperationException(\"Empty collection can't be reduced.\")\n   var index = 1\n   var accumulator: S = iterator.next()\n   while (iterator.hasNext()) {\n   accumulator = operation(index++, accumulator, iterator.next())\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left to each element and current accumulator value.\n */\npublic inline fun <S, T: S> List<T>.reduceRight(operation: (T, acc: S) -> S): S {\n   val iterator = listIterator(size)\n   if (!iterator.hasPrevious())\n   throw UnsupportedOperationException(\"Empty list can't be reduced.\")\n   var accumulator: S = iterator.previous()\n   while (iterator.hasPrevious()) {\n   accumulator = operation(iterator.previous(), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last element and applying [operation] from right to left\n * to each element with its index in the original list and current accumulator value.\n * @param [operation] function that takes the index of an element, the element itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <S, T: S> List<T>.reduceRightIndexed(operation: (index: Int, T, acc: S) -> S): S {\n   val iterator = listIterator(size)\n   if (!iterator.hasPrevious())\n   throw UnsupportedOperationException(\"Empty list can't be reduced.\")\n   var accumulator: S = iterator.previous()\n   while (iterator.hasPrevious()) {\n   val index = iterator.previousIndex()\n

accumulator = operation(index, iterator.previous(), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the collection.\n */\npublic inline fun <T> Iterable<T>.sumBy(selector: (T) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the collection.\n */\npublic inline fun <T> Iterable<T>.sumByDouble(selector: (T) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns an original collection containing all the non-`null` elements, throwing an [IllegalArgumentException] if there are any `null` elements.\n */\npublic fun <T : Any> Iterable<T?>.requireNoNulls(): Iterable<T> {\n   for (element in this) {\n   if (element == null) {\n   throw IllegalArgumentException(\"null element found in $this.\")\n   }\n   }\n   @Suppress(\"UNCHECKED_CAST\")\n   return this as Iterable<T>\n}\n\n/**\n * Returns an original collection containing all the non-`null` elements, throwing an [IllegalArgumentException] if there are any `null` elements.\n */\npublic fun <T : Any> List<T?>.requireNoNulls(): List<T> {\n   for (element in this) {\n   if (element == null) {\n   throw IllegalArgumentException(\"null element found in $this.\")\n   }\n   }\n   @Suppress(\"UNCHECKED_CAST\")\n   return this as List<T>\n}\n\n/**\n * Splits this collection into a list of lists each not exceeding the given [size].\n * \n * The last list in the resulting list may have less elements than the given [size].\n * \n * @param size the number of elements to take in each list, must be positive and can be greater than the number of elements in this collection.\n * \n * @sample samples.collections.Collections.Transformations.chunked\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Iterable<T>.chunked(size: Int): List<List<T>> {\n   return windowed(size, size, partialWindows = true)\n}\n\n/**\n * Splits this collection into several lists each not exceeding the given [size]\n * and applies the given [transform] function to an each.\n * \n * @return list of results of the [transform] applied to an each list.\n * \n * Note that the list passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * The last list may have less elements than the given [size].\n * \n * @param size the number of elements to take in each list, must be positive and can be greater than the number of elements in this collection.\n * \n * @sample samples.text.Strings.chunkedTransform\n */\n@SinceKotlin(\"1.2\")\npublic fun <T, R> Iterable<T>.chunked(size: Int, transform: (List<T>) -> R): List<R> {\n   return windowed(size, size, partialWindows = true, transform = transform)\n}\n\n/**\n * Returns a list containing all elements of the original collection without the first occurrence of the given [element].\n */\npublic operator fun <T> Iterable<T>.minus(element: T): List<T> {\n   val result = ArrayList<T>(collectionSizeOrDefault(10))\n   var removed = false\n   return this.filterTo(result) { if (!removed && it == element) { removed = true; false } else true }\n}\n\n/**\n * Returns a list containing all elements of the original collection except the elements contained in the given [elements] array.\n */\npublic operator fun <T> Iterable<T>.minus(elements: Array<out T>): List<T> {\n   if (elements.isEmpty()) return this.toList()\n   val other = elements.toHashSet()\n   return this.filterNot { it in other }\n}\n\n/**\n * Returns a list containing all elements of the original collection except the elements contained in the given [elements] collection.\n */\npublic operator fun <T> Iterable<T>.minus(elements: Iterable<T>): List<T> {\n   val other = elements.convertToSetForSetOperationWith(this)\n   if (other.isEmpty())\n   return this.toList()\n   return this.filterNot { it in other }\n}\n\n/**\n * Returns a list containing all elements of the original collection except the elements contained in the given [elements] sequence.\n */\npublic operator fun <T> Iterable<T>.minus(elements: Sequence<T>): List<T> {\n   val other = elements.toHashSet()\n   if (other.isEmpty())\n   return this.toList()\n   return this.filterNot { it in other }\n}\n\n/**\n * Returns a list containing all elements of the original collection without the first occurrence of the given [element].\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable<T>.minusElement(element: T): List<T> {\n   return minus(element)\n}\n\n/**\n * Splits the original collection into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n */\npublic inline fun <T> Iterable<T>.partition(predicate: (T) -> Boolean): Pair<List<T>, List<T>> {\n   val first = ArrayList<T>()\n   val second = ArrayList<T>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n

} else {\n   second.add(element)\n   }\n }\n   return Pair(first, second)\n}\n\n/**\n * Returns a list containing all elements of the original collection and then the given [element].\n */\npublic operator fun <T> Iterable<T>.plus(element: T): List<T> {\n   if (this is Collection) return this.plus(element)\n   val result = ArrayList<T>()\n   result.addAll(this)\n   result.add(element)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then the given [element].\n */\npublic operator fun <T> Collection<T>.plus(element: T): List<T> {\n   val result = ArrayList<T>(size + 1)\n   result.addAll(this)\n   result.add(element)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] array.\n */\npublic operator fun <T> Iterable<T>.plus(elements: Array<out T>): List<T> {\n   if (this is Collection) return this.plus(elements)\n   val result = ArrayList<T>()\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] array.\n */\npublic operator fun <T> Collection<T>.plus(elements: Array<out T>): List<T> {\n   val result = ArrayList<T>(this.size + elements.size)\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] collection.\n */\npublic operator fun <T> Iterable<T>.plus(elements: Iterable<T>): List<T> {\n   if (this is Collection) return this.plus(elements)\n   val result = ArrayList<T>()\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] collection.\n */\npublic operator fun <T> Collection<T>.plus(elements: Iterable<T>): List<T> {\n   if (elements is Collection) {\n   val result = ArrayList<T>(this.size + elements.size)\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n   } else {\n   val result = ArrayList<T>(this)\n   result.addAll(elements)\n   return result\n   }\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] sequence.\n */\npublic operator fun <T> Iterable<T>.plus(elements: Sequence<T>): List<T> {\n   val result = ArrayList<T>()\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then all elements of the given [elements] sequence.\n */\npublic operator fun <T> Collection<T>.plus(elements: Sequence<T>): List<T> {\n   val result = ArrayList<T>(this.size + 10)\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a list containing all elements of the original collection and then the given [element].\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable<T>.plusElement(element: T): List<T> {\n   return plus(element)\n}\n\n/**\n * Returns a list containing all elements of the original collection and then the given [element].\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Collection<T>.plusElement(element: T): List<T> {\n   return plus(element)\n}\n\n/**\n * Returns a list of snapshots of the window of the given [size]\n * sliding along this collection with the given [step], where each\n * snapshot is a list.\n * \n * Several last lists may have less elements than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this collection.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.takeWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Iterable<T>.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false): List<List<T>> {\n   checkWindowSizeStep(size, step)\n   if (this is RandomAccess && this is List) {\n   val thisSize = this.size\n   val result = ArrayList<List<T>>((thisSize + step - 1) / step)\n   var index = 0\n   while (index < thisSize) {\n   val windowSize = size.coerceAtMost(thisSize - index)\n   if (windowSize < size && !partialWindows) break\n   result.add(List(windowSize) { this[it + index] })\n   index += step\n   }\n   return result\n   }\n   val result = ArrayList<List<T>>()\n   windowedIterator(iterator(), size, step, partialWindows, reuseBuffer = false).forEach {\n   result.add(it)\n   }\n   return result\n}\n\n/**\n * Returns a list of results of applying the given [transform] function to\n * an each list representing a view over the window of the given [size]\n * sliding along this collection with the given [step].\n * \n * Note that the list passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made

a snapshot of it.\n * Several last lists may have less elements than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this collection.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.averageWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <T, R> Iterable<T>.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false, transform: (List<T>) -> R): List<R> {\n   checkWindowSizeStep(size, step)\n   if (this is RandomAccess && this is List) {\n   val thisSize = this.size\n   val result = ArrayList<R>((thisSize + step - 1) / step)\n   val window = MovingSubList(this)\n   var index = 0\n   while (index < thisSize) {\n   window.move(index, (index + size).coerceAtMost(thisSize))\n   if (!partialWindows && window.size < size) break\n   result.add(transform(window))\n   index += step\n   }\n   return result\n   }\n   val result = ArrayList<R>()\n   windowedIterator(iterator(), size, step, partialWindows, reuseBuffer = true).forEach {\n   result.add(transform(it))\n   }\n   return result\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <T, R> Iterable<T>.zip(other: Array<out R>): List<Pair<T, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <T, R, V> Iterable<T>.zip(other: Array<out R>, transform: (a: T, b: R) -> V): List<V> {\n   val arraySize = other.size\n   val list = ArrayList<V>(minOf(collectionSizeOrDefault(10), arraySize))\n   var i = 0\n   for (element in this) {\n   if (i >= arraySize) break\n   list.add(transform(element, other[i++]))\n   }\n   return list\n}\n\n/**\n * Returns a list of pairs built from elements of both collections with same indexes. List has length of shortest collection.\n */\npublic infix fun <T, R> Iterable<T>.zip(other: Iterable<R>): List<Pair<T, R>> {\n   return zip(other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a list of values built from elements of both collections with same indexes using provided [transform]. List has length of shortest collection.\n */\npublic inline fun <T, R, V> Iterable<T>.zip(other: Iterable<R>, transform: (a: T, b: R) -> V): List<V> {\n   val first = iterator()\n   val second = other.iterator()\n   val list = ArrayList<V>(minOf(collectionSizeOrDefault(10), other.collectionSizeOrDefault(10)))\n   while (first.hasNext() && second.hasNext()) {\n   list.add(transform(first.next(), second.next()))\n   }\n   return list\n}\n\n/**\n * Returns a list of pairs of each two adjacent elements in this collection.\n * \n * The returned list is empty if this collection contains less than two elements.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNext\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Iterable<T>.zipWithNext(): List<Pair<T, T>> {\n   return zipWithNext { a, b -> a to b }\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to an each pair of two adjacent elements in this collection.\n * \n * The returned list is empty if this collection contains less than two elements.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNextToFindDeltas\n */\n@SinceKotlin(\"1.2\")\npublic inline fun <T, R> Iterable<T>.zipWithNext(transform: (a: T, b: T) -> R): List<R> {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return emptyList()\n   val result = mutableListOf<R>()\n   var current = iterator.next()\n   while (iterator.hasNext()) {\n   val next = iterator.next()\n   result.add(transform(current, next))\n   current = next\n   }\n   return result\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n */\npublic fun <T, A : Appendable> Iterable<T>.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   buffer.appendElement(element, transform)\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n *

Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n */\npublic fun <T> Iterable<T>.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Returns this collection as an [Iterable].\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Iterable<T>.asIterable(): Iterable<T> {\n   return this\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original collection returning its elements when being iterated.\n * \n * @sample samples.collections.Sequences.Building.sequenceFromCollection\n */\npublic fun <T> Iterable<T>.asSequence(): Sequence<T> {\n   return Sequence { this.iterator() }\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfByte\")\npublic fun Iterable<Byte>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfShort\")\npublic fun Iterable<Short>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfInt\")\npublic fun Iterable<Int>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfLong\")\npublic fun Iterable<Long>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfFloat\")\npublic fun Iterable<Float>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the collection.\n */\n@kotlin.jvm.JvmName(\"averageOfDouble\")\npublic fun Iterable<Double>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfByte\")\npublic fun Iterable<Byte>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfShort\")\npublic fun Iterable<Short>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfInt\")\npublic fun Iterable<Int>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfLong\")\npublic fun Iterable<Long>.sum(): Long {\n   var sum: Long = 0L\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfFloat\")\npublic fun Iterable<Float>.sum(): Float {\n   var sum: Float = 0.0f\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the collection.\n */\n@kotlin.jvm.JvmName(\"sumOfDouble\")\npublic fun Iterable<Double>.sum(): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language

governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.collections\n\nimport kotlin.comparisons.naturalOrder\nimport kotlin.math.floor\n\n/** Returns the array if it's not `null`, or an empty array otherwise. */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Array<out T>?.orEmpty(): Array<out T> = this ?: emptyArray<T>()\n\n@kotlin.internal.InlineOnly\npublic inline fun <T> Collection<T>.toTypedArray(): Array<T> = copyToArray(this)\n\n@JsName(\"copyToArray\")\n@PublishedApi\ninternal fun <T> copyToArray(collection: Collection<T>): Array<T> {\n   return if (collection.asDynamic().toArray !== undefined)\n   collection.asDynamic().toArray().unsafeCast<Array<T>>()\n   else\n   copyToArrayImpl(collection).unsafeCast<Array<T>>()\n}\n\n@JsName(\"copyToArrayImpl\")\ninternal fun copyToArrayImpl(collection: Collection<*>): Array<Any?> {\n   val array = emptyArray<Any?>()\n   val iterator = collection.iterator()\n   while (iterator.hasNext())\n   array.asDynamic().push(iterator.next())\n   return array\n}\n\n@JsName(\"copyToExistingArrayImpl\")\ninternal fun <T> copyToArrayImpl(collection: Collection<*>, array: Array<T>): Array<T> {\n   if (array.size < collection.size)\n   return copyToArrayImpl(collection).unsafeCast<Array<T>>()\n\n   val iterator = collection.iterator()\n   var index = 0\n   while (iterator.hasNext()) {\n   array[index++] = iterator.next().unsafeCast<T>()\n   }\n   if (index < array.size) {\n   array[index] = null.unsafeCast<T>()\n   }\n   return array\n}\n\n@library(\"arrayToString\")\n@Suppress(\"UNUSED_PARAMETER\")\ninternal fun arrayToString(array: Array<*>): String = definedExternally\n\n/**\n * Returns an immutable list containing only the specified object [element].\n */\npublic fun <T> listOf(element: T): List<T> = arrayListOf(element)\n\n/**\n * Returns an immutable set containing only the specified object [element].\n */\npublic fun <T> setOf(element: T): Set<T> = hashSetOf(element)\n\n/**\n * Returns an immutable map, mapping only the specified key to the\n * specified value.\n */\npublic fun <K, V> mapOf(pair: Pair<K, V>): Map<K, V> = hashMapOf(pair)\n\n/**\n * Fills the list with the provided [value].\n *\n * Each element in the list gets replaced with the [value].\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> MutableList<T>.fill(value: T): Unit {\n   for (index in 0..lastIndex) {\n   this[index] = value\n   }\n}\n\n/**\n * Randomly shuffles elements in this list.\n *\n * See: https://en.wikipedia.org/wiki/Fisher%E2%80%93Yates_shuffle#The_modern_algorithm\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> MutableList<T>.shuffle(): Unit {\n   for (i in lastIndex downTo 1) {\n   val j = rand(i + 1)\n   val copy = this[i]\n   this[i] = this[j]\n   this[j] = copy\n   }\n}\nprivate fun rand(upperBound: Int) = floor(kotlin.js.Math.random() * upperBound).toInt()\n\n/**\n * Returns a new list with the elements of this list randomly shuffled.\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Iterable<T>.shuffled(): List<T> = toMutableList().apply { shuffle() }\n\n/**\n * Sorts elements in the list in-place according to their natural sort order.\n */\npublic fun <T : Comparable<T>> MutableList<T>.sort(): Unit {\n   collectionsSort(this, naturalOrder())\n}\n\n/**\n * Sorts elements in the list in-place according to the order specified with [comparator].\n */\npublic fun <T> MutableList<T>.sortWith(comparator: Comparator<in T>): Unit {\n   collectionsSort(this, comparator)\n}\n\nprivate fun <T> collectionsSort(list: MutableList<T>, comparator: Comparator<in T>) {\n   if (list.size <= 1) return\n\n   val array = copyToArray(list)\n\n   array.asDynamic().sort(comparator.asDynamic().compare.bind(comparator))\n\n   for (i in 0 until array.size) {\n   list[i] = array[i]\n   }\n}\n\ninternal fun <T> arrayOfNulls(reference: Array<out T>, size: Int): Array<T> {\n   return arrayOfNulls<Any>(size).unsafeCast<Array<T>>()\n}\n\n// no singleton map implementation in js, return map as is\ninternal inline fun <K, V> Map<K, V>.toSingletonMapOrSelf(): Map<K, V> = this\n\ninternal inline fun <K, V> Map<out K, V>.toSingletonMap(): Map<K, V> = this.toMutableMap()\n\ninternal inline fun <T> Array<out T>.copyToArrayOfAny(isVarargs: Boolean): Array<out Any?> =\n   if (isVarargs)\n   // no need to copy vararg array in JS\n   this\n   else\n   this.copyOf()\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\n\npackage kotlin.collections\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/**\n * Returns the given iterator itself. This allows to use an instance of iterator in a `for` loop.\n * @sample samples.collections.Iterators.iterator\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Iterator<T>.iterator(): Iterator<T> = this\n\n/**\n * Returns an [Iterator] wrapping each value produced by this [Iterator] with the [IndexedValue],\n * containing value and it's index.\n * @sample samples.collections.Iterators.withIndexIterator\n */\npublic fun <T>

Iterator<T>.withIndex(): Iterator<IndexedValue<T>> = IndexingIterator(this)\n\n/**\n * Performs the given [operation] on each element of this [Iterator].\n * @sample samples.collections.Iterators.forEachIterator\n */\npublic inline fun <T> Iterator<T>.forEach(operation: (T) -> Unit) : Unit {\n   for (element in this) operation(element)\n}\n\n/**\n * Iterator transforming original `iterator` into iterator of [IndexedValue], counting index from zero.\n */\ninternal class IndexingIterator<out T>(private val iterator: Iterator<T>) : Iterator<IndexedValue<T>> {\n   private var index = 0\n   final override fun hasNext(): Boolean = iterator.hasNext()\n   final override fun next(): IndexedValue<T> = IndexedValue(index++, iterator.next())\n}\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"MapsKt\")\n\npackage kotlin.collections\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Returns a [List] containing all key-value pairs.\n */\npublic fun <K, V> Map<out K, V>.toList(): List<Pair<K, V>> {\n   if (size == 0)\n   return emptyList()\n   val iterator = entries.iterator()\n   if (!iterator.hasNext())\n   return emptyList()\n   val first = iterator.next()\n   if (!iterator.hasNext())\n   return listOf(first.toPair())\n   val result = ArrayList<Pair<K, V>>(size)\n   result.add(first.toPair())\n   do {\n   result.add(iterator.next().toPair())\n   } while (iterator.hasNext())\n   return result\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each entry of original map.\n */\npublic inline fun <K, V, R> Map<out K, V>.flatMap(transform: (Map.Entry<K, V>) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each entry of original map, to the given [destination].\n */\npublic inline fun <K, V, R, C : MutableCollection<in R>> Map<out K, V>.flatMapTo(destination: C, transform: (Map.Entry<K, V>) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each entry in the original map.\n */\npublic inline fun <K, V, R> Map<out K, V>.map(transform: (Map.Entry<K, V>) -> R): List<R> {\n   return mapTo(ArrayList<R>(size), transform)\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each entry in the original map.\n */\npublic inline fun <K, V, R : Any> Map<out K, V>.mapNotNull(transform: (Map.Entry<K, V>) -> R?): List<R> {\n   return mapNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each entry in the original map\n * and appends only the non-null results to the given [destination].\n */\npublic inline fun <K, V, R : Any, C : MutableCollection<in R>> Map<out K, V>.mapNotNullTo(destination: C, transform: (Map.Entry<K, V>) -> R?): C {\n   forEach { element -> transform(element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each entry of the original map\n * and appends the results to the given [destination].\n */\npublic inline fun <K, V, R, C : MutableCollection<in R>> Map<out K, V>.mapTo(destination: C, transform: (Map.Entry<K, V>) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Returns `true` if all entries match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun <K, V> Map<out K, V>.all(predicate: (Map.Entry<K, V>) -> Boolean): Boolean {\n   if (isEmpty()) return true\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if map has at least one entry.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun <K, V> Map<out K, V>.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if at least one entry matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n */\npublic inline fun <K, V> Map<out K, V>.any(predicate: (Map.Entry<K, V>) -> Boolean): Boolean {\n   if (isEmpty()) return false\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns the number of entries in this map.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<out K, V>.count(): Int {\n   return size\n}\n\n/**\n * Returns the number of entries matching the given [predicate].\n */\npublic inline fun <K, V> Map<out K, V>.count(predicate: (Map.Entry<K, V>) -> Boolean): Int {\n   if (isEmpty()) return 0\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Performs the given [action] on each entry.\n */\n@kotlin.internal.HidesMembers\npublic inline fun <K, V> Map<out K, V>.forEach(action: (Map.Entry<K, V>) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Returns the first entry

yielding the largest value of the given function or `null` if there are no entries.\n
*/\n@kotlin.internal.InlineOnly\npublic inline fun <K, V, R : Comparable<R>> Map<out K, V>.maxBy(selector: (Map.Entry<K, V>) -> R): Map.Entry<K, V>? {\n   return entries.maxBy(selector)\n}\n\n/**\n * Returns the first entry having the largest value according to the provided [comparator] or `null` if there are no entries.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<out K, V>.maxWith(comparator: Comparator<in Map.Entry<K, V>>): Map.Entry<K, V>? {\n   return entries.maxWith(comparator)\n}\n\n/**\n * Returns the first entry yielding the smallest value of the given function or `null` if there are no entries.\n */\npublic inline fun <K, V, R : Comparable<R>> Map<out K, V>.minBy(selector: (Map.Entry<K, V>) -> R): Map.Entry<K, V>? {\n   return entries.minBy(selector)\n}\n\n/**\n * Returns the first entry having the smallest value according to the provided [comparator] or `null` if there are no entries.\n */\npublic fun <K, V> Map<out K, V>.minWith(comparator: Comparator<in Map.Entry<K, V>>): Map.Entry<K, V>? {\n   return entries.minWith(comparator)\n}\n\n/**\n * Returns `true` if the map has no entries.\n *\n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun <K, V> Map<out K, V>.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if no entries match the given [predicate].\n *\n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun <K, V> Map<out K, V>.none(predicate: (Map.Entry<K, V>) -> Boolean): Boolean {\n   if (isEmpty()) return true\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Performs the given [action] on each entry and returns the map itself afterwards.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <K, V, M : Map<out K, V>> M.onEach(action: (Map.Entry<K, V>) -> Unit): M {\n   return apply { for (element in this) action(element) }\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original map returning its entries when being iterated.\n *\n@kotlin.internal.InlineOnly\npublic inline fun <K, V> Map<out K, V>.asIterable(): Iterable<Map.Entry<K, V>> {\n   return entries\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original map returning its entries when being iterated.\n */\npublic fun <K, V> Map<out K, V>.asSequence(): Sequence<Map.Entry<K, V>> {\n   return entries.asSequence()\n}\n\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.ranges\n\n\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline operator fun Float.rangeTo(that: Float): ClosedFloatingPointRange<Float> =\n   this.toDouble().rangeTo(that.toDouble()).unsafeCast<ClosedFloatingPointRange<Float>>()\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"SequencesKt\")\n\npackage kotlin.sequences\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\nimport kotlin.coroutines.experimental.*\n\n/**\n * Returns `true` if [element] is found in the sequence.\n *\n * The operation is _terminal_.\n */\npublic operator fun <@kotlin.internal.OnlyInputTypes T> Sequence<T>.contains(element: T): Boolean {\n   return indexOf(element) >= 0\n}\n\n/**\n * Returns an element at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.elementAt(index: Int): T {\n   return elementAtOrElse(index) { throw IndexOutOfBoundsException(\"Sequence doesn't contain element at index $index.\") }\n}\n\n/**\n * Returns an element at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.elementAtOrElse(index: Int, defaultValue: (Int) -> T): T {\n   if (index < 0)\n   return defaultValue(index)\n   val iterator = iterator()\n   var count = 0\n   while (iterator.hasNext()) {\n   val element = iterator.next()\n   if (index == count++)\n   return element\n   }\n   return defaultValue(index)\n}\n\n/**\n * Returns an element at the given [index] or `null` if the [index] is out of bounds of this sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.elementAtOrNull(index: Int):

T? {\n   if (index < 0)\n   return null\n   val iterator = iterator()\n   var count = 0\n   while (iterator.hasNext()) {\n   val element = iterator.next()\n   if (index == count++)\n   return element\n   }\n   return null\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if no such element was found.\n *\n * The operation is _terminal_.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence<T>.find(predicate: (T) -> Boolean): T? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n *\n * The operation is _terminal_.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence<T>.findLast(predicate: (T) -> Boolean): T? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns first element.\n * @throws [NoSuchElementException] if the sequence is empty.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.first(): T {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Sequence is empty.\")\n   return iterator.next()\n}\n\n/**\n * Returns the first element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.first(predicate: (T) -> Boolean): T {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Sequence contains no element matching the predicate.\")\n}\n\n/**\n * Returns the first element, or `null` if the sequence is empty.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.firstOrNull(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   return iterator.next()\n}\n\n/**\n * Returns the first element matching the given [predicate], or `null` if element was not found.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.firstOrNull(predicate: (T) -> Boolean): T? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns first index of [element], or -1 if the sequence does not contain element.\n *\n * The operation is _terminal_.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Sequence<T>.indexOf(element: T): Int {\n   var index = 0\n   for (item in this) {\n   if (element == item)\n   return index\n   index++\n   }\n   return -1\n}\n\n/**\n * Returns index of the first element matching the given [predicate], or -1 if the sequence does not contain such element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.indexOfFirst(predicate: (T) -> Boolean): Int {\n   var index = 0\n   for (item in this) {\n   if (predicate(item))\n   return index\n   index++\n   }\n   return -1\n}\n\n/**\n * Returns index of the last element matching the given [predicate], or -1 if the sequence does not contain such element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.indexOfLast(predicate: (T) -> Boolean): Int {\n   var lastIndex = -1\n   var index = 0\n   for (item in this) {\n   if (predicate(item))\n   lastIndex = index\n   index++\n   }\n   return lastIndex\n}\n\n/**\n * Returns the last element.\n * @throws [NoSuchElementException] if the sequence is empty.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.last(): T {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Sequence is empty.\")\n   var last = iterator.next()\n   while (iterator.hasNext())\n   last = iterator.next()\n   return last\n}\n\n/**\n * Returns the last element matching the given [predicate].\n * @throws [NoSuchElementException] if no such element is found.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.last(predicate: (T) -> Boolean): T {\n   var last: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   last = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Sequence contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return last as T\n}\n\n/**\n * Returns last index of [element], or -1 if the sequence does not contain element.\n *\n * The operation is _terminal_.\n */\npublic fun <@kotlin.internal.OnlyInputTypes T> Sequence<T>.lastIndexOf(element: T): Int {\n   var lastIndex = -1\n   var index = 0\n   for (item in this) {\n   if (element == item)\n   lastIndex = index\n   index++\n   }\n   return lastIndex\n}\n\n/**\n * Returns the last element, or `null` if the sequence is empty.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.lastOrNull(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   var last = iterator.next()\n   while (iterator.hasNext())\n   last = iterator.next()\n   return last\n}\n\n/**\n * Returns the last element matching the given [predicate], or `null` if no such element was found.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.lastOrNull(predicate: (T) -> Boolean): T? {\n   var last: T? = null\n   for (element in this) {\n   if

(predicate(element)) {\n   last = element\n   }\n   }\n   return last\n}\n\n/**\n * Returns the single element, or throws an exception if the sequence is empty or has more than one element.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.single(): T {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   throw NoSuchElementException(\"Sequence is empty.\")\n   val single = iterator.next()\n   if (iterator.hasNext())\n   throw IllegalArgumentException(\"Sequence has more than one element.\")\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or throws exception if there is no or more than one matching element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.single(predicate: (T) -> Boolean): T {\n   var single: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Sequence contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Sequence contains no element matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as T\n}\n\n/**\n * Returns single element, or `null` if the sequence is empty or has more than one element.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.singleOrNull(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext())\n   return null\n   val single = iterator.next()\n   if (iterator.hasNext())\n   return null\n   return single\n}\n\n/**\n * Returns the single element matching the given [predicate], or `null` if element was not found or more than one element was found.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.singleOrNull(predicate: (T) -> Boolean): T? {\n   var single: T? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns a sequence containing all elements except first [n] elements.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.drop(n: Int): Sequence<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return when {\n   n == 0 -> this\n   this is DropTakeSequence -> this.drop(n)\n   else -> DropSequence(this, n)\n   }\n}\n\n/**\n * Returns a sequence containing all elements except first elements that satisfy the given [predicate].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.dropWhile(predicate: (T) -> Boolean): Sequence<T> {\n   return DropWhileSequence(this, predicate)\n}\n\n/**\n * Returns a sequence containing only elements matching the given [predicate].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.filter(predicate: (T) -> Boolean): Sequence<T> {\n   return FilteringSequence(this, true, predicate)\n}\n\n/**\n * Returns a sequence containing only elements matching the given [predicate].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.filterIndexed(predicate: (index: Int, T) -> Boolean): Sequence<T> {\n   // TODO: Rewrite with generalized MapFilterIndexingSequence\n   return TransformingSequence(FilteringSequence(IndexingSequence(this), true, { predicate(it.index, it.value) }), { it.value })\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of an element and the element itself\n * and returns the result of predicate evaluation on the element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, C : MutableCollection<in T>> Sequence<T>.filterIndexedTo(destination: C, predicate: (index: Int, T) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.add(element)\n   }\n   return destination\n}\n\n/**\n * Returns a sequence containing all elements that are instances of specified type parameter R.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic inline fun <reified R> Sequence<*>.filterIsInstance(): Sequence<@kotlin.internal.NoInfer R> {\n   @Suppress(\"UNCHECKED_CAST\")\n   return filter { it is R } as Sequence<R>\n}\n\n/**\n * Appends all elements that are instances of specified type parameter R to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <reified R, C : MutableCollection<in R>> Sequence<*>.filterIsInstanceTo(destination: C): C {\n   for (element in this) if (element is R) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a sequence containing all elements not matching the given [predicate].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.filterNot(predicate: (T) -> Boolean): Sequence<T> {\n   return FilteringSequence(this, false,

predicate)\n}\n\n/**\n * Returns a sequence containing all elements that are not `null`.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T : Any> Sequence<T?>.filterNotNull(): Sequence<T> {\n   @Suppress(\"UNCHECKED_CAST\")\n   return filterNot { it == null } as Sequence<T>\n}\n\n/**\n * Appends all elements that are not `null` to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic fun <C : MutableCollection<in T>, T : Any> Sequence<T?>.filterNotNullTo(destination: C): C {\n   for (element in this) if (element != null) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements not matching the given [predicate] to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, C : MutableCollection<in T>> Sequence<T>.filterNotTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Appends all elements matching the given [predicate] to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, C : MutableCollection<in T>> Sequence<T>.filterTo(destination: C, predicate: (T) -> Boolean): C {\n   for (element in this) if (predicate(element)) destination.add(element)\n   return destination\n}\n\n/**\n * Returns a sequence containing first [n] elements.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.take(n: Int): Sequence<T> {\n   require(n >= 0) { \"Requested element count $n is less than zero.\" }\n   return when {\n   n == 0 -> emptySequence()\n   this is DropTakeSequence -> this.take(n)\n   else -> TakeSequence(this, n)\n   }\n}\n\n/**\n * Returns a sequence containing first elements satisfying the given [predicate].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.takeWhile(predicate: (T) -> Boolean): Sequence<T> {\n   return TakeWhileSequence(this, predicate)\n}\n\n/**\n * Returns a sequence that yields elements of this sequence sorted according to their natural sort order.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic fun <T : Comparable<T>> Sequence<T>.sorted(): Sequence<T> {\n   return object : Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   val sortedList = this@sorted.toMutableList()\n   sortedList.sort()\n   return sortedList.iterator()\n   }\n   }\n}\n\n/**\n * Returns a sequence that yields elements of this sequence sorted according to natural sort order of the value returned by specified [selector] function.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic inline fun <T, R : Comparable<R>> Sequence<T>.sortedBy(crossinline selector: (T) -> R?): Sequence<T> {\n   return sortedWith(compareBy(selector))\n}\n\n/**\n * Returns a sequence that yields elements of this sequence sorted descending according to natural sort order of the value returned by specified [selector] function.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic inline fun <T, R : Comparable<R>> Sequence<T>.sortedByDescending(crossinline selector: (T) -> R?): Sequence<T> {\n   return sortedWith(compareByDescending(selector))\n}\n\n/**\n * Returns a sequence that yields elements of this sequence sorted descending according to their natural sort order.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic fun <T : Comparable<T>> Sequence<T>.sortedDescending(): Sequence<T> {\n   return sortedWith(reverseOrder())\n}\n\n/**\n * Returns a sequence that yields elements of this sequence sorted according to the specified [comparator].\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic fun <T> Sequence<T>.sortedWith(comparator: Comparator<in T>): Sequence<T> {\n   return object : Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   val sortedList = this@sortedWith.toMutableList()\n   sortedList.sortWith(comparator)\n   return sortedList.iterator()\n   }\n   }\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to elements of the given sequence.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original sequence.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K, V> Sequence<T>.associate(transform: (T) -> Pair<K, V>): Map<K, V> {\n   return associateTo(LinkedHashMap<K, V>(), transform)\n}\n\n/**\n * Returns a [Map] containing the elements from the given sequence indexed by the key\n * returned from [keySelector] function applied to each element.\n * \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original sequence.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K> Sequence<T>.associateBy(keySelector: (T) -> K): Map<K, T> {\n   return associateByTo(LinkedHashMap<K, T>(), keySelector)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to elements of the given sequence.\n

* \n * If any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n
* \n * The returned map preserves the entry iteration order of the original sequence.\n *\n * The operation is
terminal.\n */\npublic inline fun <T, K, V> Sequence<T>.associateBy(keySelector: (T) -> K, valueTransform: (T)
-> V): Map<K, V> {\n   return associateByTo(LinkedHashMap<K, V>(), keySelector, valueTransform)\n}\n\n/**\n
* Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the
[keySelector] function applied to each element of the given sequence\n * and value is the element itself.\n * \n * If
any two elements would have the same key returned by [keySelector] the last one gets added to the map.\n *\n * The
operation is _terminal_.\n */\npublic inline fun <T, K, M : MutableMap<in K, in T>>
Sequence<T>.associateByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n
destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the
[destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * and
value is provided by the [valueTransform] function applied to elements of the given sequence.\n * \n * If any two
elements would have the same key returned by [keySelector] the last one gets added to the map.\n *\n * The
operation is _terminal_.\n */\npublic inline fun <T, K, V, M : MutableMap<in K, in V>>
Sequence<T>.associateByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for
(element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return
destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by
[transform] function applied to each element of the given sequence.\n * \n * If any of two pairs would have the same
key the last one gets added to the map.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K, V, M :
MutableMap<in K, in V>> Sequence<T>.associateTo(destination: M, transform: (T) -> Pair<K, V>): M {\n   for
(element in this) {\n   destination += transform(element)\n   }\n   return destination\n}\n\n/**\n * Appends all
elements to the given [destination] collection.\n *\n * The operation is _terminal_.\n */\npublic fun <T, C :
MutableCollection<in T>> Sequence<T>.toCollection(destination: C): C {\n   for (item in this) {\n
destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Returns a [HashSet] of all elements.\n *\n * The
operation is _terminal_.\n */\npublic fun <T> Sequence<T>.toHashSet(): HashSet<T> {\n   return
toCollection(HashSet<T>())\n}\n\n/**\n * Returns a [List] containing all elements.\n *\n * The operation is
terminal.\n */\npublic fun <T> Sequence<T>.toList(): List<T> {\n   return
this.toMutableList().optimizeReadOnlyList()\n}\n\n/**\n * Returns a [MutableList] filled with all elements of this
sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.toMutableList(): MutableList<T>
{\n   return toCollection(ArrayList<T>())\n}\n\n/**\n * Returns a [Set] of all elements.\n * \n * The returned set
preserves the element iteration order of the original sequence.\n *\n * The operation is _terminal_.\n */\npublic fun
<T> Sequence<T>.toSet(): Set<T> {\n   return
toCollection(LinkedHashSet<T>()).optimizeReadOnlySet()\n}\n\n/**\n * Returns a single sequence of all elements
from results of [transform] function being invoked on each element of original sequence.\n *\n * The operation is
intermediate and _stateless_.\n */\npublic fun <T, R> Sequence<T>.flatMap(transform: (T) -> Sequence<R>):
Sequence<R> {\n   return FlatteningSequence(this, transform, { it.iterator() })\n}\n\n/**\n * Appends all elements
yielded from results of [transform] function being invoked on each element of original sequence, to the given
[destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R, C : MutableCollection<in R>>
Sequence<T>.flatMapTo(destination: C, transform: (T) -> Sequence<R>): C {\n   for (element in this) {\n   val
list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Groups elements of
the original sequence by the key returned by the given [keySelector] function\n * applied to each element and
returns a map where each group key is associated with a list of corresponding elements.\n * \n * The returned map
preserves the entry iteration order of the keys produced from the original sequence.\n * \n * @sample
samples.collections.Collections.Transformations.groupBy\n *\n * The operation is _terminal_.\n */\npublic inline
fun <T, K> Sequence<T>.groupBy(keySelector: (T) -> K): Map<K, List<T>> {\n   return
groupByTo(LinkedHashMap<K, MutableList<T>>(), keySelector)\n}\n\n/**\n * Groups values returned by the
[valueTransform] function applied to each element of the original sequence\n * by the key returned by the given
[keySelector] function applied to the element\n * and returns a map where each group key is associated with a list of

corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original sequence.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K, V> Sequence<T>.groupBy(keySelector: (T) -> K, valueTransform: (T) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups elements of the original sequence by the key returned by the given [keySelector] function\n * applied to each element and puts to the [destination] map each group key associated with a list of corresponding elements.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K, M : MutableMap<in K, MutableList<T>>> Sequence<T>.groupByTo(destination: M, keySelector: (T) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<T>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each element of the original sequence\n * by the key returned by the given [keySelector] function applied to the element\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, K, V, M : MutableMap<in K, MutableList<V>>> Sequence<T>.groupByTo(destination: M, keySelector: (T) -> K, valueTransform: (T) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Creates a [Grouping] source from a sequence to be used later with one of group-and-fold operations\n * using the specified [keySelector] function to extract a key from each element.\n * \n * @sample samples.collections.Collections.Transformations.groupingByEachCount\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K> Sequence<T>.groupingBy(crossinline keySelector: (T) -> K): Grouping<T, K> {\n   return object : Grouping<T, K> {\n   override fun sourceIterator(): Iterator<T> = this@groupingBy.iterator()\n   override fun keyOf(element: T): K = keySelector(element)\n   }\n}\n\n/**\n * Returns a sequence containing the results of applying the given [transform] function\n * to each element in the original sequence.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T, R> Sequence<T>.map(transform: (T) -> R): Sequence<R> {\n   return TransformingSequence(this, transform)\n}\n\n/**\n * Returns a sequence containing the results of applying the given [transform] function\n * to each element and its index in the original sequence.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T, R> Sequence<T>.mapIndexed(transform: (index: Int, T) -> R): Sequence<R> {\n   return TransformingIndexedSequence(this, transform)\n}\n\n/**\n * Returns a sequence containing only the non-null results of applying the given [transform] function\n * to each element and its index in the original sequence.\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T, R : Any> Sequence<T>.mapIndexedNotNull(transform: (index: Int, T) -> R?): Sequence<R> {\n   return TransformingIndexedSequence(this, transform).filterNotNull()\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original sequence\n * and appends only the non-null results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Sequence<T>.mapIndexedNotNullTo(destination: C, transform: (index: Int, T) -> R?): C {\n   forEachIndexed { index, element -> transform(index, element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element and its index in the original sequence\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of an element and the element itself\n * and returns the result of the transform applied to the element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Sequence<T>.mapIndexedTo(destination:

C, transform: (index: Int, T) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Returns a sequence containing only the non-null results of applying the given [transform] function\n * to each element in the original sequence.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T, R : Any> Sequence<T>.mapNotNull(transform: (T) -> R?): Sequence<R> {\n   return TransformingSequence(this, transform).filterNotNull()\n}\n\n/**\n * Applies the given [transform] function to each element in the original sequence\n * and appends only the non-null results to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R : Any, C : MutableCollection<in R>> Sequence<T>.mapNotNullTo(destination: C, transform: (T) -> R?): C {\n   forEach { element -> transform(element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each element of the original sequence\n * and appends the results to the given [destination].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R, C : MutableCollection<in R>> Sequence<T>.mapTo(destination: C, transform: (T) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Returns a sequence of [IndexedValue] for each element of the original sequence.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T> Sequence<T>.withIndex(): Sequence<IndexedValue<T>> {\n   return IndexingSequence(this)\n}\n\n/**\n * Returns a sequence containing only distinct elements from the given sequence.\n * \n * The elements in the resulting sequence are in the same order as they were in the source sequence.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic fun <T> Sequence<T>.distinct(): Sequence<T> {\n   return this.distinctBy { it }\n}\n\n/**\n * Returns a sequence containing only elements from the given sequence\n * having distinct keys returned by the given [selector] function.\n * \n * The elements in the resulting sequence are in the same order as they were in the source sequence.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic fun <T, K> Sequence<T>.distinctBy(selector: (T) -> K): Sequence<T> {\n   return DistinctSequence(this, selector)\n}\n\n/**\n * Returns a mutable set containing all distinct elements from the given sequence.\n * \n * The returned set preserves the element iteration order of the original sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.toMutableSet(): MutableSet<T> {\n   val set = LinkedHashSet<T>()\n   for (item in this) set.add(item)\n   return set\n}\n\n/**\n * Returns `true` if all elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.all(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if sequence has at least one element.\n * \n * @sample samples.collections.Collections.Aggregates.any\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.any(): Boolean {\n   return iterator().hasNext()\n}\n\n/**\n * Returns `true` if at least one element matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.any(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns the number of elements in this sequence.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.count(): Int {\n   var count = 0\n   for (element in this) count++\n   return count\n}\n\n/**\n * Returns the number of elements matching the given [predicate].\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.count(predicate: (T) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R> Sequence<T>.fold(initial: R, operation: (acc: R, T) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original sequence.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself, and calculates the next accumulator value.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R> Sequence<T>.foldIndexed(initial: R, operation: (index: Int, acc: R, T) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return

accumulator\n}\n\n/**\n * Performs the given [action] on each element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.forEach(action: (T) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each element, providing sequential index with the element.\n * @param [action] function that takes the index of an element and the element itself\n * and performs the desired action on the element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.forEachIndexed(action: (index: Int, T) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n *\n * The operation is _terminal_.\n */\n@SinceKotlin(\"1.1\")\npublic fun Sequence<Double>.max(): Double? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   if (max.isNaN()) return max\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n *\n * The operation is _terminal_.\n */\n@SinceKotlin(\"1.1\")\npublic fun Sequence<Float>.max(): Float? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   if (max.isNaN()) return max\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the largest element or `null` if there are no elements.\n * \n * The operation is _terminal_.\n */\npublic fun <T : Comparable<T>> Sequence<T>.max(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first element yielding the largest value of the given function or `null` if there are no elements.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R : Comparable<R>> Sequence<T>.maxBy(selector: (T) -> R): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var maxElem = iterator.next()\n   var maxValue = selector(maxElem)\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first element having the largest value according to the provided [comparator] or `null` if there are no elements.\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.maxWith(comparator: Comparator<in T>): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var max = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n *\n * The operation is _terminal_.\n */\n@SinceKotlin(\"1.1\")\npublic fun Sequence<Double>.min(): Double? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   if (min.isNaN()) return min\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n * \n * If any of elements is `NaN` returns `NaN`.\n *\n * The operation is _terminal_.\n */\n@SinceKotlin(\"1.1\")\npublic fun Sequence<Float>.min(): Float? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   if (min.isNaN()) return min\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (e.isNaN()) return e\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the smallest element or `null` if there are no elements.\n *\n * The operation is _terminal_.\n */\npublic fun <T : Comparable<T>> Sequence<T>.min(): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first element yielding the smallest value of the given function or `null` if there are no elements.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T, R : Comparable<R>> Sequence<T>.minBy(selector: (T) -> R): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var minElem = iterator.next()\n   var minValue = selector(minElem)\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first element having the smallest value according to the provided [comparator] or `null` if there are no elements.\n *\n * The operation is _terminal_.\n */\npublic fun <T>

Sequence<T>.minWith(comparator: Comparator<in T>): T? {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return null\n   var min = iterator.next()\n   while (iterator.hasNext()) {\n   val e = iterator.next()\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns `true` if the sequence has no elements.\n * \n * @sample samples.collections.Collections.Aggregates.none\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.none(): Boolean {\n   return !iterator().hasNext()\n}\n\n/**\n * Returns `true` if no elements match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.none(predicate: (T) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Returns a sequence which performs the given [action] on each element of the original sequence as they pass through it.\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T> Sequence<T>.onEach(action: (T) -> Unit): Sequence<T> {\n   return map {\n   action(it)\n   it\n   }\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right to current accumulator value and each element.\n *\n * The operation is _terminal_.\n */\npublic inline fun <S, T: S> Sequence<T>.reduce(operation: (acc: S, T) -> S): S {\n   val iterator = this.iterator()\n   if (!iterator.hasNext()) throw UnsupportedOperationException(\"Empty sequence can't be reduced.\")\n   var accumulator: S = iterator.next()\n   while (iterator.hasNext()) {\n   accumulator = operation(accumulator, iterator.next())\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first element and applying [operation] from left to right\n * to current accumulator value and each element with its index in the original sequence.\n * @param [operation] function that takes the index of an element, current accumulator value\n * and the element itself and calculates the next accumulator value.\n *\n * The operation is _terminal_.\n */\npublic inline fun <S, T: S> Sequence<T>.reduceIndexed(operation: (index: Int, acc: S, T) -> S): S {\n   val iterator = this.iterator()\n   if (!iterator.hasNext()) throw UnsupportedOperationException(\"Empty sequence can't be reduced.\")\n   var index = 1\n   var accumulator: S = iterator.next()\n   while (iterator.hasNext()) {\n   accumulator = operation(index++, accumulator, iterator.next())\n   }\n   return accumulator\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the sequence.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.sumBy(selector: (T) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each element in the sequence.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.sumByDouble(selector: (T) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns an original collection containing all the non-`null` elements, throwing an [IllegalArgumentException] if there are any `null` elements.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T : Any> Sequence<T?>.requireNoNulls(): Sequence<T> {\n   return map { it ?: throw IllegalArgumentException(\"null element found in $this.\") }\n}\n\n/**\n * Splits this sequence into a sequence of lists each not exceeding the given [size].\n * \n * The last list in the resulting sequence may have less elements than the given [size].\n * \n * @param size the number of elements to take in each list, must be positive and can be greater than the number of elements in this sequence.\n * \n * @sample samples.collections.Collections.Transformations.chunked\n *\n * The operation is _intermediate_ and _stateful_.\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Sequence<T>.chunked(size: Int): Sequence<List<T>> {\n   return windowed(size, size, partialWindows = true)\n}\n\n/**\n * Splits this sequence into several lists each not exceeding the given [size]\n * and applies the given [transform] function to an each.\n * \n * @return sequence of results of the [transform] applied to an each list.\n * \n * Note that the list passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * The last list may have less elements than the given [size].\n * \n * @param size the number of elements to take in each list, must be positive and can be greater than the number of elements in this sequence.\n * \n * @sample samples.text.Strings.chunkedTransform\n *\n * The operation is _intermediate_ and _stateful_.\n */\n@SinceKotlin(\"1.2\")\npublic fun <T, R> Sequence<T>.chunked(size: Int, transform: (List<T>) -> R): Sequence<R> {\n   return windowed(size, size, partialWindows = true, transform = transform)\n}\n\n/**\n * Returns a sequence containing all elements of the

original sequence without the first occurrence of the given [element].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic operator fun <T> Sequence<T>.minus(element: T): Sequence<T> {\n   return object: Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   var removed = false\n   return this@minus.filter { if (!removed && it == element) { removed = true; false } else true }.iterator()\n   }\n   }\n}\n\n/**\n * Returns a sequence containing all elements of original sequence except the elements contained in the given [elements] array.\n * \n * Note that the source sequence and the array being subtracted are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic operator fun <T> Sequence<T>.minus(elements: Array<out T>): Sequence<T> {\n   if (elements.isEmpty()) return this\n   return object: Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   val other = elements.toHashSet()\n   return this@minus.filterNot { it in other }.iterator()\n   }\n   }\n}\n\n/**\n * Returns a sequence containing all elements of original sequence except the elements contained in the given [elements] collection.\n * \n * Note that the source sequence and the collection being subtracted are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n *\n * The operation is _intermediate_ and _stateful_.\n */\npublic operator fun <T> Sequence<T>.minus(elements: Iterable<T>): Sequence<T> {\n   return object: Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   val other = elements.convertToSetForSetOperation()\n   if (other.isEmpty())\n   return this@minus.iterator()\n   else\n   return this@minus.filterNot { it in other }.iterator()\n   }\n   }\n}\n\n/**\n * Returns a sequence containing all elements of original sequence except the elements contained in the given [elements] sequence.\n * \n * Note that the source sequence and the sequence being subtracted are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n * \n * The operation is _intermediate_ for this sequence and _terminal_ and _stateful_ for the [elements] sequence.\n */\npublic operator fun <T> Sequence<T>.minus(elements: Sequence<T>): Sequence<T> {\n   return object: Sequence<T> {\n   override fun iterator(): Iterator<T> {\n   val other = elements.toHashSet()\n   if (other.isEmpty())\n   return this@minus.iterator()\n   else\n   return this@minus.filterNot { it in other }.iterator()\n   }\n   }\n}\n\n/**\n * Returns a sequence containing all elements of the original sequence without the first occurrence of the given [element].\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence<T>.minusElement(element: T): Sequence<T> {\n   return minus(element)\n}\n\n/**\n * Splits the original sequence into pair of lists,\n * where *first* list contains elements for which [predicate] yielded `true`,\n * while *second* list contains elements for which [predicate] yielded `false`.\n *\n * The operation is _terminal_.\n */\npublic inline fun <T> Sequence<T>.partition(predicate: (T) -> Boolean): Pair<List<T>, List<T>> {\n   val first = ArrayList<T>()\n   val second = ArrayList<T>()\n   for (element in this) {\n   if (predicate(element)) {\n   first.add(element)\n   } else {\n   second.add(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Returns a sequence containing all elements of the original sequence and then the given [element].\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic operator fun <T> Sequence<T>.plus(element: T): Sequence<T> {\n   return sequenceOf(this, sequenceOf(element)).flatten()\n}\n\n/**\n * Returns a sequence containing all elements of original sequence and then all elements of the given [elements] array.\n * \n * Note that the source sequence and the array being added are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic operator fun <T> Sequence<T>.plus(elements: Array<out T>): Sequence<T> {\n   return this.plus(elements.asList())\n}\n\n/**\n * Returns a sequence containing all elements of original sequence and then all elements of the given [elements] collection.\n * \n * Note that the source sequence and the collection being added are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic operator fun <T> Sequence<T>.plus(elements: Iterable<T>): Sequence<T> {\n   return sequenceOf(this, elements.asSequence()).flatten()\n}\n\n/**\n * Returns a sequence containing all elements of original sequence and

then all elements of the given [elements] sequence.\n * \n * Note that the source sequence and the sequence being added are iterated only when an `iterator` is requested from\n * the resulting sequence. Changing any of them between successive calls to `iterator` may affect the result.\n *\n * The operation is _intermediate_ and _stateless_.\n */\npublic operator fun <T> Sequence<T>.plus(elements: Sequence<T>): Sequence<T> {\n   return sequenceOf(this, elements).flatten()\n}\n\n/**\n * Returns a sequence containing all elements of the original sequence and then the given [element].\n * \n * The operation is _intermediate_ and _stateless_.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence<T>.plusElement(element: T): Sequence<T> {\n return plus(element)\n}\n\n/**\n * Returns a sequence of snapshots of the window of the given [size]\n * sliding along this sequence with the given [step], where each\n * snapshot is a list.\n * \n * Several last lists may have less elements than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.takeWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Sequence<T>.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false): Sequence<List<T>> {\n   return windowedSequence(size, step, partialWindows, reuseBuffer = false)\n}\n\n/**\n * Returns a sequence of results of applying the given [transform] function to\n * an each list representing a view over the window of the given [size]\n * sliding along this sequence with the given [step].\n * \n * Note that the list passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * Several last lists may have less elements than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.averageWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <T, R> Sequence<T>.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false, transform: (List<T>) -> R): Sequence<R> {\n   return windowedSequence(size, step, partialWindows, reuseBuffer = true).map(transform)\n}\n\n/**\n * Returns a sequence of pairs built from elements of both sequences with same indexes.\n * Resulting sequence has length of shortest input sequence.\n * \n * The operation is _intermediate_ and _stateless_.\n */\npublic infix fun <T, R> Sequence<T>.zip(other: Sequence<R>): Sequence<Pair<T, R>> {\n return MergingSequence(this, other) { t1, t2 -> t1 to t2 }\n}\n\n/**\n * Returns a sequence of values built from elements of both collections with same indexes using provided [transform]. Resulting sequence has length of shortest input sequences.\n * \n * The operation is _intermediate_ and _stateless_.\n */\npublic fun <T, R, V> Sequence<T>.zip(other: Sequence<R>, transform: (a: T, b: R) -> V): Sequence<V> {\n   return MergingSequence(this, other, transform)\n}\n\n/**\n * Returns a sequence of pairs of each two adjacent elements in this sequence.\n * \n * The returned sequence is empty if this sequence contains less than two elements.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNext\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@SinceKotlin(\"1.2\")\npublic fun <T> Sequence<T>.zipWithNext(): Sequence<Pair<T, T>> {\n return zipWithNext { a, b -> a to b }\n}\n\n/**\n * Returns a sequence containing the results of applying the given [transform] function\n * to an each pair of two adjacent elements in this sequence.\n * \n * The returned sequence is empty if this sequence contains less than two elements.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNextToFindDeltas\n *\n * The operation is _intermediate_ and _stateless_.\n */\n@SinceKotlin(\"1.2\")\npublic fun <T, R> Sequence<T>.zipWithNext(transform: (a: T, b: T) -> R): Sequence<R> {\n   return buildSequence result@ {\n   val iterator = iterator()\n   if (!iterator.hasNext()) return@result\n   var current = iterator.next()\n   while (iterator.hasNext()) {\n   val next = iterator.next()\n   yield(transform(current, next))\n   current = next\n   }\n   }\n}\n\n/**\n * Appends the string from all the elements separated using [separator] and using the given [prefix] and [postfix] if

supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinTo\n *\n * The operation is _terminal_.\n */\npublic fun <T, A : Appendable> Sequence<T>.joinTo(buffer: A, separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): A {\n   buffer.append(prefix)\n   var count = 0\n   for (element in this) {\n   if (++count > 1) buffer.append(separator)\n   if (limit < 0 || count <= limit) {\n   buffer.appendElement(element, transform)\n   } else break\n   }\n   if (limit >= 0 && count > limit) buffer.append(truncated)\n   buffer.append(postfix)\n   return buffer\n}\n\n/**\n * Creates a string from all the elements separated using [separator] and using the given [prefix] and [postfix] if supplied.\n * \n * If the collection could be huge, you can specify a non-negative value of [limit], in which case only the first [limit]\n * elements will be appended, followed by the [truncated] string (which defaults to \"...\").\n * \n * @sample samples.collections.Collections.Transformations.joinToString\n *\n * The operation is _terminal_.\n */\npublic fun <T> Sequence<T>.joinToString(separator: CharSequence = \", \", prefix: CharSequence = \"\", postfix: CharSequence = \"\", limit: Int = -1, truncated: CharSequence = \"...\", transform: ((T) -> CharSequence)? = null): String {\n   return joinTo(StringBuilder(), separator, prefix, postfix, limit, truncated, transform).toString()\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original sequence returning its elements when being iterated.\n */\npublic fun <T> Sequence<T>.asIterable(): Iterable<T> {\n   return Iterable { this.iterator() }\n}\n\n/**\n * Returns this sequence as a [Sequence].\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Sequence<T>.asSequence(): Sequence<T> {\n   return this\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfByte\")\npublic fun Sequence<Byte>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfShort\")\npublic fun Sequence<Short>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfInt\")\npublic fun Sequence<Int>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfLong\")\npublic fun Sequence<Long>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfFloat\")\npublic fun Sequence<Float>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns an average value of elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"averageOfDouble\")\npublic fun Sequence<Double>.average(): Double {\n   var sum: Double = 0.0\n   var count: Int = 0\n   for (element in this) {\n   sum += element\n   count += 1\n   }\n   return if (count == 0) Double.NaN else sum / count\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfByte\")\npublic fun Sequence<Byte>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfShort\")\npublic fun Sequence<Short>.sum(): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n * \n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfInt\")\npublic fun Sequence<Int>.sum(): Int {\n   var sum: Int = 0\n   for

(element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n *\n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfLong\")\npublic fun Sequence<Long>.sum(): Long {\n   var sum: Long = 0L\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n *\n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfFloat\")\npublic fun Sequence<Float>.sum(): Float {\n   var sum: Float = 0.0f\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all elements in the sequence.\n *\n * The operation is _terminal_.\n */\n@kotlin.jvm.JvmName(\"sumOfDouble\")\npublic fun Sequence<Double>.sum(): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += element\n   }\n   return sum\n}\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"SetsKt\")\n\npackage kotlin.collections\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Returns a set containing all elements of the original set except the given [element].\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.minus(element: T): Set<T> {\n   val result = LinkedHashSet<T>(mapCapacity(size))\n   var removed = false\n   return this.filterTo(result) { if (!removed && it == element) { removed = true; false } else true }\n}\n\n/**\n * Returns a set containing all elements of the original set except the elements contained in the given [elements] array.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.minus(elements: Array<out T>): Set<T> {\n   val result = LinkedHashSet<T>(this)\n   result.removeAll(elements)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set except the elements contained in the given [elements] collection.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.minus(elements: Iterable<T>): Set<T> {\n   val other = elements.convertToSetForSetOperationWith(this)\n   if (other.isEmpty())\n   return this.toSet()\n   if (other is Set)\n   return this.filterNotTo(LinkedHashSet<T>()) { it in other }\n   val result = LinkedHashSet<T>(this)\n   result.removeAll(other)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set except the elements contained in the given [elements] sequence.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.minus(elements: Sequence<T>): Set<T> {\n   val result = LinkedHashSet<T>(this)\n   result.removeAll(elements)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set except the given [element].\n * \n * The returned set preserves the element iteration order of the original set.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Set<T>.minusElement(element: T): Set<T> {\n   return minus(element)\n}\n\n/**\n * Returns a set containing all elements of the original set and then the given [element] if it isn't already in this set.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.plus(element: T): Set<T> {\n   val result = LinkedHashSet<T>(mapCapacity(size + 1))\n   result.addAll(this)\n   result.add(element)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set and the given [elements] array,\n * which aren't already in this set.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.plus(elements: Array<out T>): Set<T> {\n   val result = LinkedHashSet<T>(mapCapacity(this.size + elements.size))\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set and the given [elements] collection,\n * which aren't already in this set.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.plus(elements: Iterable<T>): Set<T> {\n   val result = LinkedHashSet<T>(mapCapacity(elements.collectionSizeOrNull()?.let { this.size + it } ?: this.size * 2))\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set and the given [elements] sequence,\n * which aren't already in this set.\n * \n * The returned set preserves the element iteration order of the original set.\n */\npublic operator fun <T> Set<T>.plus(elements: Sequence<T>): Set<T> {\n   val result = LinkedHashSet<T>(mapCapacity(this.size * 2))\n   result.addAll(this)\n   result.addAll(elements)\n   return result\n}\n\n/**\n * Returns a set containing all elements of the original set and then the given [element] if it isn't already in this set.\n * \n * The returned set preserves the element iteration order of the original set.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T>

Set<T>.plusElement(element: T): Set<T> {\n   return plus(element)\n}\n}\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n\npackage kotlin.text\n\n//\n// NOTE THIS FILE IS AUTO-GENERATED by the GenerateStandardLib.kt\n// See: https://github.com/JetBrains/kotlin/tree/master/libraries/stdlib\n//\n\nimport kotlin.js.*\nimport kotlin.comparisons.*\n\n/**\n * Returns a character at the given [index] or throws an [IndexOutOfBoundsException] if the [index] is out of bounds of this char sequence.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.elementAt(index: Int): Char {\n   return get(index)\n}\n\n/**\n * Returns a character at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this char sequence.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.elementAtOrElse(index: Int, defaultValue: (Int) -> Char): Char {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns a character at the given [index] or `null` if the [index] is out of bounds of this char sequence.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.elementAtOrNull(index: Int): Char? {\n   return this.getOrNull(index)\n}\n\n/**\n * Returns the first character matching the given [predicate], or `null` if no such character was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.find(predicate: (Char) -> Boolean): Char? {\n   return firstOrNull(predicate)\n}\n\n/**\n * Returns the last character matching the given [predicate], or `null` if no such character was found.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.findLast(predicate: (Char) -> Boolean): Char? {\n   return lastOrNull(predicate)\n}\n\n/**\n * Returns first character.\n * @throws [NoSuchElementException] if the char sequence is empty.\n */\npublic fun CharSequence.first(): Char {\n   if (isEmpty())\n   throw NoSuchElementException(\"Char sequence is empty.\")\n   return this[0]\n}\n\n/**\n * Returns the first character matching the given [predicate].\n * @throws [NoSuchElementException] if no such character is found.\n */\npublic inline fun CharSequence.first(predicate: (Char) -> Boolean): Char {\n   for (element in this) if (predicate(element)) return element\n   throw NoSuchElementException(\"Char sequence contains no character matching the predicate.\")\n}\n\n/**\n * Returns the first character, or `null` if the char sequence is empty.\n */\npublic fun CharSequence.firstOrNull(): Char? {\n   return if (isEmpty()) null else this[0]\n}\n\n/**\n * Returns the first character matching the given [predicate], or `null` if character was not found.\n */\npublic inline fun CharSequence.firstOrNull(predicate: (Char) -> Boolean): Char? {\n   for (element in this) if (predicate(element)) return element\n   return null\n}\n\n/**\n * Returns a character at the given [index] or the result of calling the [defaultValue] function if the [index] is out of bounds of this char sequence.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.getOrElse(index: Int, defaultValue: (Int) -> Char): Char {\n   return if (index >= 0 && index <= lastIndex) get(index) else defaultValue(index)\n}\n\n/**\n * Returns a character at the given [index] or `null` if the [index] is out of bounds of this char sequence.\n */\npublic fun CharSequence.getOrNull(index: Int): Char? {\n   return if (index >= 0 && index <= lastIndex) get(index) else null\n}\n\n/**\n * Returns index of the first character matching the given [predicate], or -1 if the char sequence does not contain such character.\n */\npublic inline fun CharSequence.indexOfFirst(predicate: (Char) -> Boolean): Int {\n   for (index in indices) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns index of the last character matching the given [predicate], or -1 if the char sequence does not contain such character.\n */\npublic inline fun CharSequence.indexOfLast(predicate: (Char) -> Boolean): Int {\n   for (index in indices.reversed()) {\n   if (predicate(this[index])) {\n   return index\n   }\n   }\n   return -1\n}\n\n/**\n * Returns the last character.\n * @throws [NoSuchElementException] if the char sequence is empty.\n */\npublic fun CharSequence.last(): Char {\n   if (isEmpty())\n   throw NoSuchElementException(\"Char sequence is empty.\")\n   return this[lastIndex]\n}\n\n/**\n * Returns the last character matching the given [predicate].\n * @throws [NoSuchElementException] if no such character is found.\n */\npublic inline fun CharSequence.last(predicate: (Char) -> Boolean): Char {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   throw NoSuchElementException(\"Char sequence contains no character matching the predicate.\")\n}\n\n/**\n * Returns the last character, or `null` if the char sequence is empty.\n */\npublic fun CharSequence.lastOrNull(): Char? {\n   return if (isEmpty()) null else this[length - 1]\n}\n\n/**\n * Returns the last character matching the given [predicate], or `null` if no such character

was found.\n *\npublic inline fun CharSequence.lastOrNull(predicate: (Char) -> Boolean): Char? {\n   for (index in this.indices.reversed()) {\n   val element = this[index]\n   if (predicate(element)) return element\n   }\n   return null\n}\n\n/**\n * Returns the single character, or throws an exception if the char sequence is empty or has more than one character.\n *\npublic fun CharSequence.single(): Char {\n   return when (length) {\n   0 -> throw NoSuchElementException(\"Char sequence is empty.\")\n   1 -> this[0]\n   else -> throw IllegalArgumentException(\"Char sequence has more than one element.\")\n   }\n}\n\n/**\n * Returns the single character matching the given [predicate], or throws exception if there is no or more than one matching character.\n *\npublic inline fun CharSequence.single(predicate: (Char) -> Boolean): Char {\n   var single: Char? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) throw IllegalArgumentException(\"Char sequence contains more than one matching element.\")\n   single = element\n   found = true\n   }\n   }\n   if (!found) throw NoSuchElementException(\"Char sequence contains no character matching the predicate.\")\n   @Suppress(\"UNCHECKED_CAST\")\n   return single as Char\n}\n\n/**\n * Returns single character, or `null` if the char sequence is empty or has more than one character.\n *\npublic fun CharSequence.singleOrNull(): Char? {\n   return if (length == 1) this[0] else null\n}\n\n/**\n * Returns the single character matching the given [predicate], or `null` if character was not found or more than one character was found.\n *\npublic inline fun CharSequence.singleOrNull(predicate: (Char) -> Boolean): Char? {\n   var single: Char? = null\n   var found = false\n   for (element in this) {\n   if (predicate(element)) {\n   if (found) return null\n   single = element\n   found = true\n   }\n   }\n   if (!found) return null\n   return single\n}\n\n/**\n * Returns a subsequence of this char sequence with the first [n] characters removed.\n *\npublic fun CharSequence.drop(n: Int): CharSequence {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return subSequence(n.coerceAtMost(length), length)\n}\n\n/**\n * Returns a string with the first [n] characters removed.\n *\npublic fun String.drop(n: Int): String {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return substring(n.coerceAtMost(length))\n}\n\n/**\n * Returns a subsequence of this char sequence with the last [n] characters removed.\n *\npublic fun CharSequence.dropLast(n: Int): CharSequence {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return take((length - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a string with the last [n] characters removed.\n *\npublic fun String.dropLast(n: Int): String {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return take((length - n).coerceAtLeast(0))\n}\n\n/**\n * Returns a subsequence of this char sequence containing all characters except last characters that satisfy the given [predicate].\n *\npublic inline fun CharSequence.dropLastWhile(predicate: (Char) -> Boolean): CharSequence {\n   for (index in lastIndex downTo 0)\n   if (!predicate(this[index]))\n   return subSequence(0, index + 1)\n   return \"\"\n}\n\n/**\n * Returns a string containing all characters except last characters that satisfy the given [predicate].\n *\npublic inline fun String.dropLastWhile(predicate: (Char) -> Boolean): String {\n   for (index in lastIndex downTo 0)\n   if (!predicate(this[index]))\n   return substring(0, index + 1)\n   return \"\"\n}\n\n/**\n * Returns a subsequence of this char sequence containing all characters except first characters that satisfy the given [predicate].\n *\npublic inline fun CharSequence.dropWhile(predicate: (Char) -> Boolean): CharSequence {\n   for (index in this.indices)\n   if (!predicate(this[index]))\n   return subSequence(index, length)\n   return \"\"\n}\n\n/**\n * Returns a string containing all characters except first characters that satisfy the given [predicate].\n *\npublic inline fun String.dropWhile(predicate: (Char) -> Boolean): String {\n   for (index in this.indices)\n   if (!predicate(this[index]))\n   return substring(index)\n   return \"\"\n}\n\n/**\n * Returns a char sequence containing only those characters from the original char sequence that match the given [predicate].\n *\npublic inline fun CharSequence.filter(predicate: (Char) -> Boolean): CharSequence {\n   return filterTo(StringBuilder(), predicate)\n}\n\n/**\n * Returns a string containing only those characters from the original string that match the given [predicate].\n *\npublic inline fun String.filter(predicate: (Char) -> Boolean): String {\n   return filterTo(StringBuilder(), predicate).toString()\n}\n\n/**\n * Returns a char sequence containing only those characters from the original char sequence that match the given [predicate].\n * @param [predicate] function that takes the index of a character and the character itself\n * and returns the result of predicate evaluation on the character.\n *\npublic inline fun CharSequence.filterIndexed(predicate: (index: Int, Char) -> Boolean):

CharSequence {\n   return filterIndexedTo(StringBuilder(), predicate)\n}\n\n/**\n * Returns a string containing only those characters from the original string that match the given [predicate].\n * @param [predicate] function that takes the index of a character and the character itself\n * and returns the result of predicate evaluation on the character.\n */\npublic inline fun String.filterIndexed(predicate: (index: Int, Char) -> Boolean): String {\n   return filterIndexedTo(StringBuilder(), predicate).toString()\n}\n\n/**\n * Appends all characters matching the given [predicate] to the given [destination].\n * @param [predicate] function that takes the index of a character and the character itself\n * and returns the result of predicate evaluation on the character.\n */\npublic inline fun <C : Appendable> CharSequence.filterIndexedTo(destination: C, predicate: (index: Int, Char) -> Boolean): C {\n   forEachIndexed { index, element ->\n   if (predicate(index, element)) destination.append(element)\n   }\n   return destination\n}\n\n/**\n * Returns a char sequence containing only those characters from the original char sequence that do not match the given [predicate].\n */\npublic inline fun CharSequence.filterNot(predicate: (Char) -> Boolean): CharSequence {\n   return filterNotTo(StringBuilder(), predicate)\n}\n\n/**\n * Returns a string containing only those characters from the original string that do not match the given [predicate].\n */\npublic inline fun String.filterNot(predicate: (Char) -> Boolean): String {\n   return filterNotTo(StringBuilder(), predicate).toString()\n}\n\n/**\n * Appends all characters not matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : Appendable> CharSequence.filterNotTo(destination: C, predicate: (Char) -> Boolean): C {\n   for (element in this) if (!predicate(element)) destination.append(element)\n   return destination\n}\n\n/**\n * Appends all characters matching the given [predicate] to the given [destination].\n */\npublic inline fun <C : Appendable> CharSequence.filterTo(destination: C, predicate: (Char) -> Boolean): C {\n   for (index in 0 until length) {\n   val element = get(index)\n   if (predicate(element)) destination.append(element)\n   }\n   return destination\n}\n\n/**\n * Returns a char sequence containing characters of the original char sequence at the specified range of [indices].\n */\npublic fun CharSequence.slice(indices: IntRange): CharSequence {\n   if (indices.isEmpty()) return \"\"\n   return subSequence(indices)\n}\n\n/**\n * Returns a string containing characters of the original string at the specified range of [indices].\n */\npublic fun String.slice(indices: IntRange): String {\n   if (indices.isEmpty()) return \"\"\n   return substring(indices)\n}\n\n/**\n * Returns a char sequence containing characters of the original char sequence at specified [indices].\n */\npublic fun CharSequence.slice(indices: Iterable<Int>): CharSequence {\n   val size = indices.collectionSizeOrDefault(10)\n   if (size == 0) return \"\"\n   val result = StringBuilder(size)\n   for (i in indices) {\n   result.append(get(i))\n   }\n   return result\n}\n\n/**\n * Returns a string containing characters of the original string at specified [indices].\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.slice(indices: Iterable<Int>): String {\n   return (this as CharSequence).slice(indices).toString()\n}\n\n/**\n * Returns a subsequence of this char sequence containing the first [n] characters from this char sequence, or the entire char sequence if this char sequence is shorter.\n */\npublic fun CharSequence.take(n: Int): CharSequence {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return subSequence(0, n.coerceAtMost(length))\n}\n\n/**\n * Returns a string containing the first [n] characters from this string, or the entire string if this string is shorter.\n */\npublic fun String.take(n: Int): String {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   return substring(0, n.coerceAtMost(length))\n}\n\n/**\n * Returns a subsequence of this char sequence containing the last [n] characters from this char sequence, or the entire char sequence if this char sequence is shorter.\n */\npublic fun CharSequence.takeLast(n: Int): CharSequence {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   val length = length\n   return subSequence(length - n.coerceAtMost(length), length)\n}\n\n/**\n * Returns a string containing the last [n] characters from this string, or the entire string if this string is shorter.\n */\npublic fun String.takeLast(n: Int): String {\n   require(n >= 0) { \"Requested character count $n is less than zero.\" }\n   val length = length\n   return substring(length - n.coerceAtMost(length))\n}\n\n/**\n * Returns a subsequence of this char sequence containing last characters that satisfy the given [predicate].\n */\npublic inline fun CharSequence.takeLastWhile(predicate: (Char) -> Boolean): CharSequence {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return subSequence(index + 1, length)\n   }\n   }\n   return subSequence(0, length)\n}\n\n/**\n * Returns a string containing last characters that satisfy the given [predicate].\n */\npublic inline fun

String.takeLastWhile(predicate: (Char) -> Boolean): String {\n   for (index in lastIndex downTo 0) {\n   if (!predicate(this[index])) {\n   return substring(index + 1)\n   }\n   }\n   return this\n}\n\n/**\n * Returns a subsequence of this char sequence containing the first characters that satisfy the given [predicate].\n */\npublic inline fun CharSequence.takeWhile(predicate: (Char) -> Boolean): CharSequence {\n   for (index in 0 until length)\n   if (!predicate(get(index))) {\n   return subSequence(0, index)\n   }\n   return subSequence(0, length)\n}\n\n/**\n * Returns a string containing the first characters that satisfy the given [predicate].\n */\npublic inline fun String.takeWhile(predicate: (Char) -> Boolean): String {\n   for (index in 0 until length)\n   if (!predicate(get(index))) {\n   return substring(0, index)\n   }\n   return this\n}\n\n/**\n * Returns a char sequence with characters in reversed order.\n */\npublic fun CharSequence.reversed(): CharSequence {\n   return StringBuilder(this).reverse()\n}\n\n/**\n * Returns a string with characters in reversed order.\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.reversed(): String {\n   return (this as CharSequence).reversed().toString()\n}\n\n/**\n * Returns a [Map] containing key-value pairs provided by [transform] function\n * applied to characters of the given char sequence.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original char sequence.\n */\npublic inline fun <K, V> CharSequence.associate(transform: (Char) -> Pair<K, V>): Map<K, V> {\n   val capacity = mapCapacity(length).coerceAtLeast(16)\n   return associateTo(LinkedHashMap<K, V>(capacity), transform)\n}\n\n/**\n * Returns a [Map] containing the characters from the given char sequence indexed by the key\n * returned from [keySelector] function applied to each character.\n * \n * If any two characters would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original char sequence.\n */\npublic inline fun <K> CharSequence.associateBy(keySelector: (Char) -> K): Map<K, Char> {\n   val capacity = mapCapacity(length).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, Char>(capacity), keySelector)\n}\n\n/**\n * Returns a [Map] containing the values provided by [valueTransform] and indexed by [keySelector] functions applied to characters of the given char sequence.\n * \n * If any two characters would have the same key returned by [keySelector] the last one gets added to the map.\n * \n * The returned map preserves the entry iteration order of the original char sequence.\n */\npublic inline fun <K, V> CharSequence.associateBy(keySelector: (Char) -> K, valueTransform: (Char) -> V): Map<K, V> {\n   val capacity = mapCapacity(length).coerceAtLeast(16)\n   return associateByTo(LinkedHashMap<K, V>(capacity), keySelector, valueTransform)\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function applied to each character of the given char sequence\n * and value is the character itself.\n * \n * If any two characters would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, M : MutableMap<in K, in Char>> CharSequence.associateByTo(destination: M, keySelector: (Char) -> K): M {\n   for (element in this) {\n   destination.put(keySelector(element), element)\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs,\n * where key is provided by the [keySelector] function and\n * value is provided by the [valueTransform] function applied to characters of the given char sequence.\n * \n * If any two characters would have the same key returned by [keySelector] the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> CharSequence.associateByTo(destination: M, keySelector: (Char) -> K, valueTransform: (Char) -> V): M {\n   for (element in this) {\n   destination.put(keySelector(element), valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Populates and returns the [destination] mutable map with key-value pairs\n * provided by [transform] function applied to each character of the given char sequence.\n * \n * If any of two pairs would have the same key the last one gets added to the map.\n */\npublic inline fun <K, V, M : MutableMap<in K, in V>> CharSequence.associateTo(destination: M, transform: (Char) -> Pair<K, V>): M {\n   for (element in this) {\n   destination += transform(element)\n   }\n   return destination\n}\n\n/**\n * Appends all characters to the given [destination] collection.\n */\npublic fun <C : MutableCollection<in Char>> CharSequence.toCollection(destination: C): C {\n   for (item in this) {\n   destination.add(item)\n   }\n   return destination\n}\n\n/**\n * Returns a [HashSet] of all characters.\n */\npublic fun CharSequence.toHashSet(): HashSet<Char> {\n   return

toCollection(HashSet<Char>(mapCapacity(length)))\n}\n\n/**\n * Returns a [List] containing all characters.\n */\npublic fun CharSequence.toList(): List<Char> {\n   return when (length) {\n   0 -> emptyList()\n   1 -> listOf(this[0])\n   else -> this.toMutableList()\n   }\n}\n\n/**\n * Returns a [MutableList] filled with all characters of this char sequence.\n */\npublic fun CharSequence.toMutableList(): MutableList<Char> {\n   return toCollection(ArrayList<Char>(length))\n}\n\n/**\n * Returns a [Set] of all characters.\n * \n * The returned set preserves the element iteration order of the original char sequence.\n */\npublic fun CharSequence.toSet(): Set<Char> {\n   return when (length) {\n   0 -> emptySet()\n   1 -> setOf(this[0])\n   else -> toCollection(LinkedHashSet<Char>(mapCapacity(length)))\n   }\n}\n\n/**\n * Returns a single list of all elements yielded from results of [transform] function being invoked on each character of original char sequence.\n */\npublic inline fun <R> CharSequence.flatMap(transform: (Char) -> Iterable<R>): List<R> {\n   return flatMapTo(ArrayList<R>(), transform)\n}\n\n/**\n * Appends all elements yielded from results of [transform] function being invoked on each character of original char sequence, to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> CharSequence.flatMapTo(destination: C, transform: (Char) -> Iterable<R>): C {\n   for (element in this) {\n   val list = transform(element)\n   destination.addAll(list)\n   }\n   return destination\n}\n\n/**\n * Groups characters of the original char sequence by the key returned by the given [keySelector] function\n * applied to each character and returns a map where each group key is associated with a list of corresponding characters.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original char sequence.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K> CharSequence.groupBy(keySelector: (Char) -> K): Map<K, List<Char>> {\n   return groupByTo(LinkedHashMap<K, MutableList<Char>>(), keySelector)\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each character of the original char sequence\n * by the key returned by the given [keySelector] function applied to the character\n * and returns a map where each group key is associated with a list of corresponding values.\n * \n * The returned map preserves the entry iteration order of the keys produced from the original char sequence.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V> CharSequence.groupBy(keySelector: (Char) -> K, valueTransform: (Char) -> V): Map<K, List<V>> {\n   return groupByTo(LinkedHashMap<K, MutableList<V>>(), keySelector, valueTransform)\n}\n\n/**\n * Groups characters of the original char sequence by the key returned by the given [keySelector] function\n * applied to each character and puts to the [destination] map each group key associated with a list of corresponding characters.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupBy\n */\npublic inline fun <K, M : MutableMap<in K, MutableList<Char>>> CharSequence.groupByTo(destination: M, keySelector: (Char) -> K): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<Char>() }\n   list.add(element)\n   }\n   return destination\n}\n\n/**\n * Groups values returned by the [valueTransform] function applied to each character of the original char sequence\n * by the key returned by the given [keySelector] function applied to the character\n * and puts to the [destination] map each group key associated with a list of corresponding values.\n * \n * @return The [destination] map.\n * \n * @sample samples.collections.Collections.Transformations.groupByKeysAndValues\n */\npublic inline fun <K, V, M : MutableMap<in K, MutableList<V>>> CharSequence.groupByTo(destination: M, keySelector: (Char) -> K, valueTransform: (Char) -> V): M {\n   for (element in this) {\n   val key = keySelector(element)\n   val list = destination.getOrPut(key) { ArrayList<V>() }\n   list.add(valueTransform(element))\n   }\n   return destination\n}\n\n/**\n * Creates a [Grouping] source from a char sequence to be used later with one of group-and-fold operations\n * using the specified [keySelector] function to extract a key from each character.\n * \n * @sample samples.collections.Collections.Transformations.groupingByEachCount\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <K> CharSequence.groupingBy(crossinline keySelector: (Char) -> K): Grouping<Char, K> {\n   return object : Grouping<Char, K> {\n   override fun sourceIterator(): Iterator<Char> = this@groupingBy.iterator()\n   override fun keyOf(element: Char): K = keySelector(element)\n   }\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each character in the original char sequence.\n */\npublic inline fun <R> CharSequence.map(transform: (Char) -> R): List<R> {\n   return mapTo(ArrayList<R>(length),

transform)\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to each character and its index in the original char sequence.\n * @param [transform] function that takes the index of a character and the character itself\n * and returns the result of the transform applied to the character.\n */\npublic inline fun <R> CharSequence.mapIndexed(transform: (index: Int, Char) -> R): List<R> {\n   return mapIndexedTo(ArrayList<R>(length), transform)\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each character and its index in the original char sequence.\n * @param [transform] function that takes the index of a character and the character itself\n * and returns the result of the transform applied to the character.\n */\npublic inline fun <R : Any> CharSequence.mapIndexedNotNull(transform: (index: Int, Char) -> R?): List<R> {\n   return mapIndexedNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each character and its index in the original char sequence\n * and appends only the non-null results to the given [destination].\n * @param [transform] function that takes the index of a character and the character itself\n * and returns the result of the transform applied to the character.\n */\npublic inline fun <R : Any, C : MutableCollection<in R>> CharSequence.mapIndexedNotNullTo(destination: C, transform: (index: Int, Char) -> R?): C {\n   forEachIndexed { index, element -> transform(index, element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each character and its index in the original char sequence\n * and appends the results to the given [destination].\n * @param [transform] function that takes the index of a character and the character itself\n * and returns the result of the transform applied to the character.\n */\npublic inline fun <R, C : MutableCollection<in R>> CharSequence.mapIndexedTo(destination: C, transform: (index: Int, Char) -> R): C {\n   var index = 0\n   for (item in this)\n   destination.add(transform(index++, item))\n   return destination\n}\n\n/**\n * Returns a list containing only the non-null results of applying the given [transform] function\n * to each character in the original char sequence.\n */\npublic inline fun <R : Any> CharSequence.mapNotNull(transform: (Char) -> R?): List<R> {\n   return mapNotNullTo(ArrayList<R>(), transform)\n}\n\n/**\n * Applies the given [transform] function to each character in the original char sequence\n * and appends only the non-null results to the given [destination].\n */\npublic inline fun <R : Any, C : MutableCollection<in R>> CharSequence.mapNotNullTo(destination: C, transform: (Char) -> R?): C {\n   forEach { element -> transform(element)?.let { destination.add(it) } }\n   return destination\n}\n\n/**\n * Applies the given [transform] function to each character of the original char sequence\n * and appends the results to the given [destination].\n */\npublic inline fun <R, C : MutableCollection<in R>> CharSequence.mapTo(destination: C, transform: (Char) -> R): C {\n   for (item in this)\n   destination.add(transform(item))\n   return destination\n}\n\n/**\n * Returns a lazy [Iterable] of [IndexedValue] for each character of the original char sequence.\n */\npublic fun CharSequence.withIndex(): Iterable<IndexedValue<Char>> {\n   return IndexingIterable { iterator() }\n}\n\n/**\n * Returns `true` if all characters match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.all\n */\npublic inline fun CharSequence.all(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (!predicate(element)) return false\n   return true\n}\n\n/**\n * Returns `true` if char sequence has at least one character.\n * \n * @sample samples.collections.Collections.Aggregates.any\n */\npublic fun CharSequence.any(): Boolean {\n   return !isEmpty()\n}\n\n/**\n * Returns `true` if at least one character matches the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.anyWithPredicate\n */\npublic inline fun CharSequence.any(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return true\n   return false\n}\n\n/**\n * Returns the length of this char sequence.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.count(): Int {\n   return length\n}\n\n/**\n * Returns the number of characters matching the given [predicate].\n */\npublic inline fun CharSequence.count(predicate: (Char) -> Boolean): Int {\n   var count = 0\n   for (element in this) if (predicate(element)) count++\n   return count\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right to current accumulator value and each character.\n */\npublic inline fun <R> CharSequence.fold(initial: R, operation: (acc: R, Char) -> R): R {\n   var accumulator = initial\n   for (element in this) accumulator = operation(accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from left to right\n * to current accumulator

value and each character with its index in the original char sequence.\n * @param [operation] function that takes the index of a character, current accumulator value\n * and the character itself, and calculates the next accumulator value.\n */\npublic inline fun <R> CharSequence.foldIndexed(initial: R, operation: (index: Int, acc: R, Char) -> R): R {\n   var index = 0\n   var accumulator = initial\n   for (element in this) accumulator = operation(index++, accumulator, element)\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left to each character and current accumulator value.\n */\npublic inline fun <R> CharSequence.foldRight(initial: R, operation: (Char, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with [initial] value and applying [operation] from right to left\n * to each character with its index in the original char sequence and current accumulator value.\n * @param [operation] function that takes the index of a character, the character itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun <R> CharSequence.foldRightIndexed(initial: R, operation: (index: Int, Char, acc: R) -> R): R {\n   var index = lastIndex\n   var accumulator = initial\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Performs the given [action] on each character.\n */\npublic inline fun CharSequence.forEach(action: (Char) -> Unit): Unit {\n   for (element in this) action(element)\n}\n\n/**\n * Performs the given [action] on each character, providing sequential index with the character.\n * @param [action] function that takes the index of a character and the character itself\n * and performs the desired action on the character.\n */\npublic inline fun CharSequence.forEachIndexed(action: (index: Int, Char) -> Unit): Unit {\n   var index = 0\n   for (item in this) action(index++, item)\n}\n\n/**\n * Returns the largest character or `null` if there are no characters.\n */\npublic fun CharSequence.max(): Char? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (max < e) max = e\n   }\n   return max\n}\n\n/**\n * Returns the first character yielding the largest value of the given function or `null` if there are no characters.\n */\npublic inline fun <R : Comparable<R>> CharSequence.maxBy(selector: (Char) -> R): Char? {\n   if (isEmpty()) return null\n   var maxElem = this[0]\n   var maxValue = selector(maxElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (maxValue < v) {\n   maxElem = e\n   maxValue = v\n   }\n   }\n   return maxElem\n}\n\n/**\n * Returns the first character having the largest value according to the provided [comparator] or `null` if there are no characters.\n */\npublic fun CharSequence.maxWith(comparator: Comparator<in Char>): Char? {\n   if (isEmpty()) return null\n   var max = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(max, e) < 0) max = e\n   }\n   return max\n}\n\n/**\n * Returns the smallest character or `null` if there are no characters.\n */\npublic fun CharSequence.min(): Char? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (min > e) min = e\n   }\n   return min\n}\n\n/**\n * Returns the first character yielding the smallest value of the given function or `null` if there are no characters.\n */\npublic inline fun <R : Comparable<R>> CharSequence.minBy(selector: (Char) -> R): Char? {\n   if (isEmpty()) return null\n   var minElem = this[0]\n   var minValue = selector(minElem)\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   val v = selector(e)\n   if (minValue > v) {\n   minElem = e\n   minValue = v\n   }\n   }\n   return minElem\n}\n\n/**\n * Returns the first character having the smallest value according to the provided [comparator] or `null` if there are no characters.\n */\npublic fun CharSequence.minWith(comparator: Comparator<in Char>): Char? {\n   if (isEmpty()) return null\n   var min = this[0]\n   for (i in 1..lastIndex) {\n   val e = this[i]\n   if (comparator.compare(min, e) > 0) min = e\n   }\n   return min\n}\n\n/**\n * Returns `true` if the char sequence has no characters.\n * \n * @sample samples.collections.Collections.Aggregates.none\n */\npublic fun CharSequence.none(): Boolean {\n   return isEmpty()\n}\n\n/**\n * Returns `true` if no characters match the given [predicate].\n * \n * @sample samples.collections.Collections.Aggregates.noneWithPredicate\n */\npublic inline fun CharSequence.none(predicate: (Char) -> Boolean): Boolean {\n   for (element in this) if (predicate(element)) return false\n   return true\n}\n\n/**\n * Performs the given [action] on each character and returns the char sequence itself afterwards.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <S : CharSequence> S.onEach(action: (Char) -> Unit): S {\n   return apply { for (element in this) action(element) }\n}\n\n/**\n * Accumulates value starting with the first

character and applying [operation] from left to right to current accumulator value and each character.\n */\npublic inline fun CharSequence.reduce(operation: (acc: Char, Char) -> Char): Char {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty char sequence can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with the first character and applying [operation] from left to right\n * to current accumulator value and each character with its index in the original char sequence.\n * @param [operation] function that takes the index of a character, current accumulator value\n * and the character itself and calculates the next accumulator value.\n */\npublic inline fun CharSequence.reduceIndexed(operation: (index: Int, acc: Char, Char) -> Char): Char {\n   if (isEmpty())\n   throw UnsupportedOperationException(\"Empty char sequence can't be reduced.\")\n   var accumulator = this[0]\n   for (index in 1..lastIndex) {\n   accumulator = operation(index, accumulator, this[index])\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last character and applying [operation] from right to left to each character and current accumulator value.\n */\npublic inline fun CharSequence.reduceRight(operation: (Char, acc: Char) -> Char): Char {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty char sequence can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(get(index--), accumulator)\n   }\n   return accumulator\n}\n\n/**\n * Accumulates value starting with last character and applying [operation] from right to left\n * to each character with its index in the original char sequence and current accumulator value.\n * @param [operation] function that takes the index of a character, the character itself\n * and current accumulator value, and calculates the next accumulator value.\n */\npublic inline fun CharSequence.reduceRightIndexed(operation: (index: Int, Char, acc: Char) -> Char): Char {\n   var index = lastIndex\n   if (index < 0) throw UnsupportedOperationException(\"Empty char sequence can't be reduced.\")\n   var accumulator = get(index--)\n   while (index >= 0) {\n   accumulator = operation(index, get(index), accumulator)\n   --index\n   }\n   return accumulator\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each character in the char sequence.\n */\npublic inline fun CharSequence.sumBy(selector: (Char) -> Int): Int {\n   var sum: Int = 0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Returns the sum of all values produced by [selector] function applied to each character in the char sequence.\n */\npublic inline fun CharSequence.sumByDouble(selector: (Char) -> Double): Double {\n   var sum: Double = 0.0\n   for (element in this) {\n   sum += selector(element)\n   }\n   return sum\n}\n\n/**\n * Splits this char sequence into a list of strings each not exceeding the given [size].\n * \n * The last string in the resulting list may have less characters than the given [size].\n * \n * @param size the number of elements to take in each string, must be positive and can be greater than the number of elements in this char sequence.\n * \n * @sample samples.collections.Collections.Transformations.chunked\n */\n@SinceKotlin(\"1.2\")\npublic fun CharSequence.chunked(size: Int): List<String> {\n   return windowed(size, size, partialWindows = true)\n}\n\n/**\n * Splits this char sequence into several char sequences each not exceeding the given [size]\n * and applies the given [transform] function to an each.\n * \n * @return list of results of the [transform] applied to an each char sequence.\n * \n * Note that the char sequence passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * The last char sequence may have less characters than the given [size].\n * \n * @param size the number of elements to take in each char sequence, must be positive and can be greater than the number of elements in this char sequence.\n * \n * @sample samples.text.Strings.chunkedTransform\n */\n@SinceKotlin(\"1.2\")\npublic fun <R> CharSequence.chunked(size: Int, transform: (CharSequence) -> R): List<R> {\n   return windowed(size, size, partialWindows = true, transform = transform)\n}\n\n/**\n * Splits this char sequence into a sequence of strings each not exceeding the given [size].\n * \n * The last string in the resulting sequence may have less characters than the given [size].\n * \n * @param size the number of elements to take in each string, must be positive and can be greater than the number of elements in this char sequence.\n * \n * @sample samples.collections.Collections.Transformations.chunked\n */\n@SinceKotlin(\"1.2\")\npublic fun CharSequence.chunkedSequence(size: Int): Sequence<String> {\n   return chunkedSequence(size) { it.toString() }\n}\n\n/**\n * Splits this char sequence into several char sequences each not exceeding the given [size]\n * and

applies the given [transform] function to an each.\n * \n * @return sequence of results of the [transform] applied to an each char sequence.\n * \n * Note that the char sequence passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * The last char sequence may have less characters than the given [size].\n * \n * @param size the number of elements to take in each char sequence, must be positive and can be greater than the number of elements in this char sequence.\n * \n * @sample samples.text.Strings.chunkedTransformToSequence\n */\n@SinceKotlin(\"1.2\")\npublic fun <R> CharSequence.chunkedSequence(size: Int, transform: (CharSequence) -> R): Sequence<R> {\n   return windowedSequence(size, size, partialWindows = true, transform = transform)\n}\n\n/**\n * Splits the original char sequence into pair of char sequences,\n * where *first* char sequence contains characters for which [predicate] yielded `true`,\n * while *second* char sequence contains characters for which [predicate] yielded `false`.\n */\npublic inline fun CharSequence.partition(predicate: (Char) -> Boolean): Pair<CharSequence, CharSequence> {\n   val first = StringBuilder()\n   val second = StringBuilder()\n   for (element in this) {\n   if (predicate(element)) {\n   first.append(element)\n   } else {\n   second.append(element)\n   }\n   }\n   return Pair(first, second)\n}\n\n/**\n * Splits the original string into pair of strings,\n * where *first* string contains characters for which [predicate] yielded `true`,\n * while *second* string contains characters for which [predicate] yielded `false`.\n */\npublic inline fun String.partition(predicate: (Char) -> Boolean): Pair<String, String> {\n   val first = StringBuilder()\n   val second = StringBuilder()\n   for (element in this) {\n   if (predicate(element)) {\n   first.append(element)\n   } else {\n   second.append(element)\n   }\n   }\n   return Pair(first.toString(), second.toString())\n}\n\n/**\n * Returns a list of snapshots of the window of the given [size]\n * sliding along this char sequence with the given [step], where each\n * snapshot is a string.\n * \n * Several last strings may have less characters than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this char sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.takeWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun CharSequence.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false): List<String> {\n   return windowed(size, step, partialWindows) { it.toString() }\n}\n\n/**\n * Returns a list of results of applying the given [transform] function to\n * an each char sequence representing a view over the window of the given [size]\n * sliding along this char sequence with the given [step].\n * \n * Note that the char sequence passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * Several last char sequences may have less characters than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this char sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.averageWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <R> CharSequence.windowed(size: Int, step: Int = 1, partialWindows: Boolean = false, transform: (CharSequence) -> R): List<R> {\n   checkWindowSizeStep(size, step)\n   val thisSize = this.length\n   val result = ArrayList<R>((thisSize + step - 1) / step)\n   var index = 0\n   while (index < thisSize) {\n   val end = index + size\n   val coercedEnd = if (end > thisSize) { if (partialWindows) thisSize else break } else end\n   result.add(transform(subSequence(index, coercedEnd)))\n   index += step\n   }\n   return result\n}\n\n/**\n * Returns a sequence of snapshots of the window of the given [size]\n * sliding along this char sequence with the given [step], where each\n * snapshot is a string.\n * \n * Several last strings may have less characters than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this char sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial

windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.takeWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun CharSequence.windowedSequence(size: Int, step: Int = 1, partialWindows: Boolean = false): Sequence<String> {\n   return windowedSequence(size, step, partialWindows) { it.toString() }\n}\n\n/**\n * Returns a sequence of results of applying the given [transform] function to\n * an each char sequence representing a view over the window of the given [size]\n * sliding along this char sequence with the given [step].\n * \n * Note that the char sequence passed to the [transform] function is ephemeral and is valid only inside that function.\n * You should not store it or allow it to escape in some way, unless you made a snapshot of it.\n * Several last char sequences may have less characters than the given [size].\n * \n * Both [size] and [step] must be positive and can be greater than the number of elements in this char sequence.\n * @param size the number of elements to take in each window\n * @param step the number of elements to move the window forward by on an each step, by default 1\n * @param partialWindows controls whether or not to keep partial windows in the end if any,\n * by default `false` which means partial windows won't be preserved\n * \n * @sample samples.collections.Sequences.Transformations.averageWindows\n */\n@SinceKotlin(\"1.2\")\npublic fun <R> CharSequence.windowedSequence(size: Int, step: Int = 1, partialWindows: Boolean = false, transform: (CharSequence) -> R): Sequence<R> {\n   checkWindowSizeStep(size, step)\n   val windows = (if (partialWindows) indices else 0 until length - size + 1) step step\n   return windows.asSequence().map { index -> transform(subSequence(index, (index + size).coerceAtMost(length))) }\n}\n\n/**\n * Returns a list of pairs built from characters of both char sequences with same indexes. List has length of shortest char sequence.\n */\npublic infix fun CharSequence.zip(other: CharSequence): List<Pair<Char, Char>> {\n   return zip(other) { c1, c2 -> c1 to c2 }\n}\n\n/**\n * Returns a list of values built from characters of both char sequences with same indexes using provided [transform]. List has length of shortest char sequence.\n */\npublic inline fun <V> CharSequence.zip(other: CharSequence, transform: (a: Char, b: Char) -> V): List<V> {\n   val length = minOf(this.length, other.length)\n   val list = ArrayList<V>(length)\n   for (i in 0 until length) {\n   list.add(transform(this[i], other[i]))\n   }\n   return list\n}\n\n/**\n * Returns a list of pairs of each two adjacent characters in this char sequence.\n * \n * The returned list is empty if this char sequence contains less than two characters.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNext\n */\n@SinceKotlin(\"1.2\")\npublic fun CharSequence.zipWithNext(): List<Pair<Char, Char>> {\n   return zipWithNext { a, b -> a to b }\n}\n\n/**\n * Returns a list containing the results of applying the given [transform] function\n * to an each pair of two adjacent characters in this char sequence.\n * \n * The returned list is empty if this char sequence contains less than two characters.\n * \n * @sample samples.collections.Collections.Transformations.zipWithNextToFindDeltas\n */\n@SinceKotlin(\"1.2\")\npublic inline fun <R> CharSequence.zipWithNext(transform: (a: Char, b: Char) -> R): List<R> {\n   val size = length - 1\n   if (size < 1) return emptyList()\n   val result = ArrayList<R>(size)\n   for (index in 0 until size) {\n   result.add(transform(this[index], this[index + 1]))\n   }\n   return result\n}\n\n/**\n * Creates an [Iterable] instance that wraps the original char sequence returning its characters when being iterated.\n */\npublic fun CharSequence.asIterable(): Iterable<Char> {\n   if (this is String && isEmpty()) return emptyList()\n   return Iterable { this.iterator() }\n}\n\n/**\n * Creates a [Sequence] instance that wraps the original char sequence returning its characters when being iterated.\n */\npublic fun CharSequence.asSequence(): Sequence<Char> {\n   if (this is String && isEmpty()) return emptySequence()\n   return Sequence { this.iterator() }\n}\n\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n\npackage kotlin.text\n\nimport kotlin.comparisons.*\nimport kotlin.internal.contracts.*\n\n/**\n * Returns a sub sequence of this char sequence having leading and trailing characters matching the [predicate] removed.\n */\npublic inline fun CharSequence.trim(predicate: (Char) -> Boolean): CharSequence {\n   var startIndex = 0\n   var endIndex = length

- 1\n   var startFound = false\n\n   while (startIndex <= endIndex) {\n   val index = if (!startFound) startIndex else endIndex\n   val match = predicate(this[index])\n\n   if (!startFound) {\n   if (!match)\n startFound = true\n   else\n   startIndex += 1\n   }\n   else {\n   if (!match)\n break\n   else\n   endIndex -= 1\n   }\n   }\n\n   return subSequence(startIndex, endIndex + 1)\n}\n\n/**\n * Returns a string having leading and trailing characters matching the [predicate] removed.\n */\npublic inline fun String.trim(predicate: (Char) -> Boolean): String\n   = (this as CharSequence).trim(predicate).toString()\n\n/**\n * Returns a sub sequence of this char sequence having leading characters matching the [predicate] removed.\n */\npublic inline fun CharSequence.trimStart(predicate: (Char) -> Boolean): CharSequence {\n   for (index in this.indices)\n   if (!predicate(this[index]))\n   return subSequence(index, length)\n\n   return \"\"\n}\n\n/**\n * Returns a string having leading characters matching the [predicate] removed.\n */\npublic inline fun String.trimStart(predicate: (Char) -> Boolean): String\n   = (this as CharSequence).trimStart(predicate).toString()\n\n/**\n * Returns a sub sequence of this char sequence having trailing characters matching the [predicate] removed.\n */\npublic inline fun CharSequence.trimEnd(predicate: (Char) -> Boolean): CharSequence {\n   for (index in this.indices.reversed())\n   if (!predicate(this[index]))\n   return substring(0, index + 1)\n\n   return \"\"\n}\n\n/**\n * Returns a string having trailing characters matching the [predicate] removed.\n */\npublic inline fun String.trimEnd(predicate: (Char) -> Boolean): String\n   = (this as CharSequence).trimEnd(predicate).toString()\n\n/**\n * Returns a sub sequence of this char sequence having leading and trailing characters from the [chars] array removed.\n */\npublic fun CharSequence.trim(vararg chars: Char): CharSequence = trim { it in chars }\n\n/**\n * Returns a string having leading and trailing characters from the [chars] array removed.\n */\npublic fun String.trim(vararg chars: Char): String = trim { it in chars }\n\n/**\n * Returns a sub sequence of this char sequence having leading characters from the [chars] array removed.\n */\npublic fun CharSequence.trimStart(vararg chars: Char): CharSequence = trimStart { it in chars }\n\n/**\n * Returns a string having leading characters from the [chars] array removed.\n */\npublic fun String.trimStart(vararg chars: Char): String = trimStart { it in chars }\n\n/**\n * Returns a sub sequence of this char sequence having trailing characters from the [chars] array removed.\n */\npublic fun CharSequence.trimEnd(vararg chars: Char): CharSequence = trimEnd { it in chars }\n\n/**\n * Returns a string having trailing characters from the [chars] array removed.\n */\npublic fun String.trimEnd(vararg chars: Char): String = trimEnd { it in chars }\n\n/**\n * Returns a sub sequence of this char sequence having leading and trailing whitespace removed.\n */\npublic fun CharSequence.trim(): CharSequence = trim(Char::isWhitespace)\n\n/**\n * Returns a string having leading and trailing whitespace removed.\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.trim(): String = (this as CharSequence).trim().toString()\n\n/**\n * Returns a sub sequence of this char sequence having leading whitespace removed.\n */\npublic fun CharSequence.trimStart(): CharSequence = trimStart(Char::isWhitespace)\n\n/**\n * Returns a string having leading whitespace removed.\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.trimStart(): String = (this as CharSequence).trimStart().toString()\n\n/**\n * Returns a sub sequence of this char sequence having trailing whitespace removed.\n */\npublic fun CharSequence.trimEnd(): CharSequence = trimEnd(Char::isWhitespace)\n\n/**\n * Returns a string having trailing whitespace removed.\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.trimEnd(): String = (this as CharSequence).trimEnd().toString()\n\n/**\n * Returns a char sequence with content of this char sequence padded at the beginning\n * to the specified [length] with the specified character or space.\n *\n * @param length the desired string length.\n * @param padChar the character to pad string with, if it has length less than the [length] specified. Space is used by default.\n * @returns Returns a string, of length at least [length], consisting of string prepended with [padChar] as many times.\n * as are necessary to reach that length.\n */\npublic fun CharSequence.padStart(length: Int, padChar: Char = ' '): CharSequence {\n   if (length < 0)\n   throw IllegalArgumentException(\"Desired length $length is less than zero.\")\n   if (length <= this.length)\n   return this.subSequence(0, this.length)\n   val sb = StringBuilder(length)\n   for (i in 1..(length - this.length))\n   sb.append(padChar)\n   sb.append(this)\n   return sb\n}\n\n/**\n * Pads the string to the specified [length] at the beginning with the specified character or space.\n *\n * @param length the desired string length.\n * @param padChar the character to pad string with, if it has length less than the [length] specified. Space is used by default.\n *

@returns Returns a string, of length at least [length], consisting of string prepended with [padChar] as many times.\n * as are necessary to reach that length.\n */\npublic fun String.padStart(length: Int, padChar: Char = ' '): String\n = (this as CharSequence).padStart(length, padChar).toString()\n\n/**\n * Returns a char sequence with content of this char sequence padded at the end\n * to the specified [length] with the specified character or space.\n *\n * @param length the desired string length.\n * @param padChar the character to pad string with, if it has length less than the [length] specified. Space is used by default.\n * @returns Returns a string, of length at least [length], consisting of string prepended with [padChar] as many times.\n * as are necessary to reach that length.\n */\npublic fun CharSequence.padEnd(length: Int, padChar: Char = ' '): CharSequence {\n   if (length < 0)\n   throw IllegalArgumentException(\"Desired length $length is less than zero.\")\n   if (length <= this.length)\n   return this.subSequence(0, this.length)\n\n   val sb = StringBuilder(length)\n   sb.append(this)\n   for (i in 1..(length - this.length))\n   sb.append(padChar)\n   return sb}\n\n/**\n * Pads the string to the specified [length] at the end with the specified character or space.\n *\n * @param length the desired string length.\n * @param padChar the character to pad string with, if it has length less than the [length] specified. Space is used by default.\n * @returns Returns a string, of length at least [length], consisting of string prepended with [padChar] as many times.\n * as are necessary to reach that length.\n */\npublic fun String.padEnd(length: Int, padChar: Char = ' '): String\n   = (this as CharSequence).padEnd(length, padChar).toString()\n\n/**\n * Returns `true` if this nullable char sequence is either `null` or empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence?.isNullOrEmpty(): Boolean {\n   contract {\n   returns(false) implies (this@isNullOrEmpty != null)\n   }\n\n   return this == null || this.length == 0\n}\n\n/**\n * Returns `true` if this char sequence is empty (contains no characters).\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.isEmpty(): Boolean = length == 0\n\n/**\n * Returns `true` if this char sequence is not empty.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.isNotEmpty(): Boolean = length > 0\n\n// implemented differently in JVM and JS\n//public fun String.isBlank(): Boolean = length() == 0 || all { it.isWhitespace() }\n\n/**\n * Returns `true` if this char sequence is not empty and contains some characters except of whitespace characters.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.isNotBlank(): Boolean = !isBlank()\n\n/**\n * Returns `true` if this nullable char sequence is either `null` or empty or consists solely of whitespace characters.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence?.isNullOrBlank(): Boolean {\n   contract {\n   returns(false) implies (this@isNullOrBlank != null)\n   }\n\n   return this == null || this.isBlank()\n}\n\n/**\n * Iterator for characters of the given char sequence.\n */\npublic operator fun CharSequence.iterator(): CharIterator = object : CharIterator() {\n   private var index = 0\n\n   public override fun nextChar(): Char = get(index++)\n\n   public override fun hasNext(): Boolean = index < length\n}\n\n/** Returns the string if it is not `null`, or the empty string otherwise. */\n@kotlin.internal.InlineOnly\npublic inline fun String?.orEmpty(): String = this ?: \"\"\n\n/**\n * Returns the range of valid character indices for this char sequence.\n */\npublic val CharSequence.indices: IntRange\n   get() = 0..length - 1\n\n/**\n * Returns the index of the last character in the char sequence or -1 if it is empty.\n */\npublic val CharSequence.lastIndex: Int\n   get() = this.length - 1\n\n/**\n * Returns `true` if this CharSequence has Unicode surrogate pair at the specified [index].\n */\npublic fun CharSequence.hasSurrogatePairAt(index: Int): Boolean {\n   return index in 0..length - 2\n   && this[index].isHighSurrogate()\n   && this[index + 1].isLowSurrogate()\n}\n\n/**\n * Returns a substring specified by the given [range] of indices.\n */\npublic fun String.substring(range: IntRange): String = substring(range.start, range.endInclusive + 1)\n\n/**\n * Returns a subsequence of this char sequence specified by the given [range] of indices.\n */\npublic fun CharSequence.subSequence(range: IntRange): CharSequence = subSequence(range.start, range.endInclusive + 1)\n\n/**\n * Returns a subsequence of this char sequence.\n *\n * This extension is chosen only for invocation with old-named parameters.\n * Replace parameter names with the same as those of [CharSequence.subSequence].\n */\n@kotlin.internal.InlineOnly\n@Suppress(\"EXTENSION_SHADOWED_BY_MEMBER\") // false warning\n@Deprecated(\"Use parameters named startIndex and endIndex.\", ReplaceWith(\"subSequence(startIndex = start, endIndex = end)\"))\npublic inline fun String.subSequence(start: Int, end: Int): CharSequence = subSequence(start, end)\n\n/**\n * Returns a substring of chars from a range of this char sequence starting at the

[startIndex] and ending right before the [endIndex].\n *\n * @param startIndex the start index (inclusive).\n * @param endIndex the end index (exclusive). If not specified, the length of the char sequence is used.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.substring(startIndex: Int, endIndex: Int = length): String = subSequence(startIndex, endIndex).toString()\n\n/**\n * Returns a substring of chars at indices from the specified [range] of this char sequence.\n */\npublic fun CharSequence.substring(range: IntRange): String = subSequence(range.start, range.endInclusive + 1).toString()\n\n/**\n * Returns a substring before the first occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringBefore(delimiter: Char, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(0, index)\n}\n\n/**\n * Returns a substring before the first occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringBefore(delimiter: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(0, index)\n}\n\n/**\n * Returns a substring after the first occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringAfter(delimiter: Char, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(index + 1, length)\n}\n\n/**\n * Returns a substring after the first occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringAfter(delimiter: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(index + delimiter.length, length)\n}\n\n/**\n * Returns a substring before the last occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringBeforeLast(delimiter: Char, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(0, index)\n}\n\n/**\n * Returns a substring before the last occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringBeforeLast(delimiter: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(0, index)\n}\n\n/**\n * Returns a substring after the last occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringAfterLast(delimiter: Char, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(index + 1, length)\n}\n\n/**\n * Returns a substring after the last occurrence of [delimiter].\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.substringAfterLast(delimiter: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else substring(index + delimiter.length, length)\n}\n\n/**\n * Returns a char sequence with content of this char sequence where its part at the given range\n * is replaced with the [replacement] char sequence.\n * @param startIndex the index of the first character to be replaced.\n * @param endIndex the index of the first character after the replacement to keep in the string.\n */\npublic fun CharSequence.replaceRange(startIndex: Int, endIndex: Int, replacement: CharSequence): CharSequence {\n   if (endIndex < startIndex)\n   throw IndexOutOfBoundsException(\"End index ($endIndex) is less than start index ($startIndex).\")\n   val sb = StringBuilder()\n   sb.append(this, 0, startIndex)\n   sb.append(replacement)\n   sb.append(this, endIndex, length)\n   return sb\n}\n\n/**\n * Replaces the part of the string at the given range with the [replacement] char sequence.\n * @param startIndex the index of the first character to be replaced.\n * @param endIndex the index of the first character after the replacement to keep in the string.\n */\n@kotlin.internal.InlineOnly\npublic inline fun String.replaceRange(startIndex: Int, endIndex: Int, replacement: CharSequence): String\n   = (this as CharSequence).replaceRange(startIndex, endIndex, replacement).toString()\n\n/**\n * Returns a char sequence with content of this char sequence where its part at the given [range]\n * is replaced with the [replacement] char sequence.\n *\n * The end index of the [range] is included

in the part to be replaced.\n *\npublic fun CharSequence.replaceRange(range: IntRange, replacement: CharSequence): CharSequence\n   = replaceRange(range.start, range.endInclusive + 1, replacement)\n\n/**\n * Replace the part of string at the given [range] with the [replacement] string.\n *\n * The end index of the [range] is included in the part to be replaced.\n *\n@kotlin.internal.InlineOnly\npublic inline fun String.replaceRange(range: IntRange, replacement: CharSequence): String\n   = (this as CharSequence).replaceRange(range, replacement).toString()\n\n/**\n * Returns a char sequence with content of this char sequence where its part at the given range is removed.\n *\n * @param startIndex the index of the first character to be removed.\n * @param endIndex the index of the first character after the removed part to keep in the string.\n *\n * [endIndex] is not included in the removed part.\n *\npublic fun CharSequence.removeRange(startIndex: Int, endIndex: Int): CharSequence {\n   if (endIndex < startIndex)\n   throw IndexOutOfBoundsException(\"End index ($endIndex) is less than start index ($startIndex).\")\n\n   if (endIndex == startIndex)\n   return this.subSequence(0, length)\n\n   val sb = StringBuilder(length - (endIndex - startIndex))\n   sb.append(this, 0, startIndex)\n   sb.append(this, endIndex, length)\n   return sb\n}\n\n/**\n * Removes the part of a string at a given range.\n * @param startIndex the index of the first character to be removed.\n * @param endIndex the index of the first character after the removed part to keep in the string.\n *\n * [endIndex] is not included in the removed part.\n *\n@kotlin.internal.InlineOnly\npublic inline fun String.removeRange(startIndex: Int, endIndex: Int): String\n   = (this as CharSequence).removeRange(startIndex, endIndex).toString()\n\n/**\n * Returns a char sequence with content of this char sequence where its part at the given [range] is removed.\n *\n * The end index of the [range] is included in the removed part.\n *\npublic fun CharSequence.removeRange(range: IntRange): CharSequence = removeRange(range.start, range.endInclusive + 1)\n\n/**\n * Removes the part of a string at the given [range].\n *\n * The end index of the [range] is included in the removed part.\n *\n@kotlin.internal.InlineOnly\npublic inline fun String.removeRange(range: IntRange): String\n   = (this as CharSequence).removeRange(range).toString()\n\n/**\n * If this char sequence starts with the given [prefix], returns a new char sequence\n * with the prefix removed. Otherwise, returns a new char sequence with the same characters.\n *\npublic fun CharSequence.removePrefix(prefix: CharSequence): CharSequence {\n   if (startsWith(prefix)) {\n   return subSequence(prefix.length, length)\n   }\n   return subSequence(0, length)\n}\n\n/**\n * If this string starts with the given [prefix], returns a copy of this string\n * with the prefix removed. Otherwise, returns this string.\n *\npublic fun String.removePrefix(prefix: CharSequence): String {\n   if (startsWith(prefix)) {\n   return substring(prefix.length)\n   }\n   return this\n}\n\n/**\n * If this char sequence ends with the given [suffix], returns a new char sequence\n * with the suffix removed. Otherwise, returns a new char sequence with the same characters.\n *\npublic fun CharSequence.removeSuffix(suffix: CharSequence): CharSequence {\n   if (endsWith(suffix)) {\n   return subSequence(0, length - suffix.length)\n   }\n   return subSequence(0, length)\n}\n\n/**\n * If this string ends with the given [suffix], returns a copy of this string\n * with the suffix removed. Otherwise, returns this string.\n *\npublic fun String.removeSuffix(suffix: CharSequence): String {\n   if (endsWith(suffix)) {\n   return substring(0, length - suffix.length)\n   }\n   return this\n}\n\n/**\n * When this char sequence starts with the given [prefix] and ends with the given [suffix],\n * returns a new char sequence having both the given [prefix] and [suffix] removed.\n * Otherwise returns a new char sequence with the same characters.\n *\npublic fun CharSequence.removeSurrounding(prefix: CharSequence, suffix: CharSequence): CharSequence {\n   if ((length >= prefix.length + suffix.length) && startsWith(prefix) && endsWith(suffix)) {\n   return subSequence(prefix.length, length - suffix.length)\n   }\n   return subSequence(0, length)\n}\n\n/**\n * Removes from a string both the given [prefix] and [suffix] if and only if\n * it starts with the [prefix] and ends with the [suffix].\n * Otherwise returns this string unchanged.\n *\npublic fun String.removeSurrounding(prefix: CharSequence, suffix: CharSequence): String {\n   if ((length >= prefix.length + suffix.length) && startsWith(prefix) && endsWith(suffix)) {\n   return substring(prefix.length, length - suffix.length)\n   }\n   return this\n}\n\n/**\n * When this char sequence starts with and ends with the given [delimiter],\n * returns a new char sequence having this [delimiter] removed both from the start and end.\n * Otherwise returns a new char sequence with the same characters.\n *\npublic fun CharSequence.removeSurrounding(delimiter: CharSequence): CharSequence = removeSurrounding(delimiter, delimiter)\n\n/**\n * Removes the given [delimiter] string from both

the start and the end of this string\n * if and only if it starts with and ends with the [delimiter].\n * Otherwise returns this string unchanged.\n */\npublic fun String.removeSurrounding(delimiter: CharSequence): String = removeSurrounding(delimiter, delimiter)\n\n/**\n * Replace part of string before the first occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceBefore(delimiter: Char, replacement: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(0, index, replacement)\n}\n\n/**\n * Replace part of string before the first occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceBefore(delimiter: String, replacement: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(0, index, replacement)\n}\n\n/**\n * Replace part of string after the first occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceAfter(delimiter: Char, replacement: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(index + 1, length, replacement)\n}\n\n/**\n * Replace part of string after the first occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceAfter(delimiter: String, replacement: String, missingDelimiterValue: String = this): String {\n   val index = indexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(index + delimiter.length, length, replacement)\n}\n\n/**\n * Replace part of string after the last occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceAfterLast(delimiter: String, replacement: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(index + delimiter.length, length, replacement)\n}\n\n/**\n * Replace part of string after the last occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceAfterLast(delimiter: Char, replacement: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(index + 1, length, replacement)\n}\n\n/**\n * Replace part of string before the last occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceBeforeLast(delimiter: Char, replacement: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(0, index, replacement)\n}\n\n/**\n * Replace part of string before the last occurrence of given delimiter with the [replacement] string.\n * If the string does not contain the delimiter, returns [missingDelimiterValue] which defaults to the original string.\n */\npublic fun String.replaceBeforeLast(delimiter: String, replacement: String, missingDelimiterValue: String = this): String {\n   val index = lastIndexOf(delimiter)\n   return if (index == -1) missingDelimiterValue else replaceRange(0, index, replacement)\n}\n\n\n// public fun String.replace(oldChar: Char, newChar: Char, ignoreCase: Boolean): String // JVM- and JS-specific\n// public fun String.replace(oldValue: String, newValue: String, ignoreCase: Boolean): String // JVM- and JS-specific\n\n/**\n * Returns a new string obtained by replacing each substring of this char sequence that matches the given regular expression\n * with the given [replacement].\n *\n * The [replacement] can consist of any combination of literal text and $-substitutions. To treat the replacement string\n * literally escape it with the [kotlin.text.Regex.Companion.escapeReplacement] method.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.replace(regex: Regex, replacement: String): String = regex.replace(this, replacement)\n\n/**\n * Returns a new string obtained by replacing each substring of this char sequence that matches the given regular expression\n * with the result of the given function [transform] that takes [MatchResult] and returns a string to be used as a\n * replacement for that match.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.replace(regex: Regex, noinline transform:

(MatchResult) -> CharSequence): String = regex.replace(this, transform)\n\n/**\n * Replaces the first occurrence of the given regular expression [regex] in this char sequence with specified [replacement] expression.\n *\n * @param replacement A replacement expression that can include substitutions. See [Regex.replaceFirst] for details.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.replaceFirst(regex: Regex, replacement: String): String = regex.replaceFirst(this, replacement)\n\n\n/**\n * Returns `true` if this char sequence matches the given regular expression.\n */\n@kotlin.internal.InlineOnly\npublic inline infix fun CharSequence.matches(regex: Regex): Boolean = regex.matches(this)\n\n/**\n * Implementation of [regionMatches] for CharSequences.\n * Invoked when it's already known that arguments are not Strings, so that no additional type checks are performed.\n */\ninternal fun CharSequence.regionMatchesImpl(thisOffset: Int, other: CharSequence, otherOffset: Int, length: Int, ignoreCase: Boolean): Boolean {\n   if ((otherOffset < 0) || (thisOffset < 0) || (thisOffset > this.length - length)\n || (otherOffset > other.length - length)) {\n   return false\n   }\n\n   for (index in 0 until length) {\n   if (!this[thisOffset + index].equals(other[otherOffset + index], ignoreCase))\n   return false\n   }\n   return true\n}\n\n/**\n * Returns `true` if this char sequence starts with the specified character.\n */\npublic fun CharSequence.startsWith(char: Char, ignoreCase: Boolean = false): Boolean =\n   this.length > 0 && this[0].equals(char, ignoreCase)\n\n/**\n * Returns `true` if this char sequence ends with the specified character.\n */\npublic fun CharSequence.endsWith(char: Char, ignoreCase: Boolean = false): Boolean =\n   this.length > 0 && this[lastIndex].equals(char, ignoreCase)\n\n/**\n * Returns `true` if this char sequence starts with the specified prefix.\n */\npublic fun CharSequence.startsWith(prefix: CharSequence, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase && this is String && prefix is String)\n   return this.startsWith(prefix)\n   else\n   return regionMatchesImpl(0, prefix, 0, prefix.length, ignoreCase)\n}\n\n/**\n * Returns `true` if a substring of this char sequence starting at the specified offset [startIndex] starts with the specified prefix.\n */\npublic fun CharSequence.startsWith(prefix: CharSequence, startIndex: Int, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase && this is String && prefix is String)\n   return this.startsWith(prefix, startIndex)\n   else\n   return regionMatchesImpl(startIndex, prefix, 0, prefix.length, ignoreCase)\n}\n\n/**\n * Returns `true` if this char sequence ends with the specified suffix.\n */\npublic fun CharSequence.endsWith(suffix: CharSequence, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase && this is String && suffix is String)\n   return this.endsWith(suffix)\n   else\n   return regionMatchesImpl(length - suffix.length, suffix, 0, suffix.length, ignoreCase)\n}\n\n\n// common prefix and suffix\n\n/**\n * Returns the longest string `prefix` such that this char sequence and [other] char sequence both start with this prefix,\n * taking care not to split surrogate pairs.\n * If this and [other] have no common prefix, returns the empty string.\n\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n */\npublic fun CharSequence.commonPrefixWith(other: CharSequence, ignoreCase: Boolean = false): String {\n   val shortestLength = minOf(this.length, other.length)\n\n   var i = 0\n   while (i < shortestLength && this[i].equals(other[i], ignoreCase = ignoreCase)) {\n   i++\n   }\n   if (this.hasSurrogatePairAt(i - 1) || other.hasSurrogatePairAt(i - 1)) {\n   i--\n   }\n   return subSequence(0, i).toString()\n}\n\n/**\n * Returns the longest string `suffix` such that this char sequence and [other] char sequence both end with this suffix,\n * taking care not to split surrogate pairs.\n * If this and [other] have no common suffix, returns the empty string.\n\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n */\npublic fun CharSequence.commonSuffixWith(other: CharSequence, ignoreCase: Boolean = false): String {\n   val thisLength = this.length\n   val otherLength = other.length\n   val shortestLength = minOf(thisLength, otherLength)\n\n   var i = 0\n   while (i < shortestLength && this[thisLength - i - 1].equals(other[otherLength - i - 1], ignoreCase = ignoreCase)) {\n   i++\n   }\n   if (this.hasSurrogatePairAt(thisLength - i - 1) || other.hasSurrogatePairAt(otherLength - i - 1)) {\n   i--\n   }\n   return subSequence(thisLength - i, thisLength).toString()\n}\n\n\n// indexOfAny()\n\n/**\n * Finds the index of the first occurrence of any of the specified [chars] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n * @returns An index of the first occurrence of matched character from [chars] or -1 if none of [chars] are found.\n *\n */\npublic fun CharSequence.indexOfAny(chars: CharArray, startIndex: Int = 0, ignoreCase: Boolean = false): Int {\n   if (!ignoreCase && chars.size == 1 && this is String) {\n   val char = chars.single()\n

return nativeIndexOf(char, startIndex)\n   }\n\n   for (index in startIndex.coerceAtLeast(0)..lastIndex) {\n   val charAtIndex = get(index)\n   if (chars.any { it.equals(charAtIndex, ignoreCase) })\n   return index\n   }\n   return -1\n}\n\n\n/**\n * Finds the index of the last occurrence of any of the specified [chars] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param startIndex The index of character to start searching at. The search proceeds backward toward the beginning of the string.\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n * @returns An index of the last occurrence of matched character from [chars] or -1 if none of [chars] are found.\n *\n */\npublic fun CharSequence.lastIndexOfAny(chars: CharArray, startIndex: Int = lastIndex, ignoreCase: Boolean = false): Int {\n   if (!ignoreCase && chars.size == 1 && this is String) {\n   val char = chars.single()\n   return nativeLastIndexOf(char, startIndex)\n   }\n\n\n   for (index in startIndex.coerceAtMost(lastIndex) downTo 0) {\n   val charAtIndex = get(index)\n   if (chars.any { it.equals(charAtIndex, ignoreCase) })\n   return index\n   }\n   return -1\n}\n\n\nprivate fun CharSequence.indexOf(other: CharSequence, startIndex: Int, endIndex: Int, ignoreCase: Boolean, last: Boolean = false): Int {\n   val indices = if (!last)\n   startIndex.coerceAtLeast(0)..endIndex.coerceAtMost(length)\n   else\n   startIndex.coerceAtMost(lastIndex) downTo endIndex.coerceAtLeast(0)\n\n   if (this is String && other is String) { // smart cast\n   for (index in indices) {\n   if (other.regionMatches(0, this, index, other.length, ignoreCase))\n   return index\n   }\n   } else {\n   for (index in indices) {\n   if (other.regionMatchesImpl(0, this, index, other.length, ignoreCase))\n   return index\n   }\n   }\n   return -1\n}\n\n\nprivate fun CharSequence.findAnyOf(strings: Collection<String>, startIndex: Int, ignoreCase: Boolean, last: Boolean): Pair<Int, String>? {\n   if (!ignoreCase && strings.size == 1) {\n   val string = strings.single()\n   val index = if (!last) indexOf(string, startIndex) else lastIndexOf(string, startIndex)\n   return if (index < 0) null else index to string\n   }\n\n   val indices = if (!last) startIndex.coerceAtLeast(0)..length else startIndex.coerceAtMost(lastIndex) downTo 0\n\n   if (this is String) {\n   for (index in indices) {\n   val matchingString = strings.firstOrNull { it.regionMatches(0, this, index, it.length, ignoreCase) }\n   if (matchingString != null)\n   return index to matchingString\n   }\n   } else {\n   for (index in indices) {\n   val matchingString = strings.firstOrNull { it.regionMatchesImpl(0, this, index, it.length, ignoreCase) }\n   if (matchingString != null)\n   return index to matchingString\n   }\n   }\n\n   return null\n}\n\n\n/**\n * Finds the first occurrence of any of the specified [strings] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns A pair of an index of the first occurrence of matched string from [strings] and the string matched\n * or `null` if none of [strings] are found.\n *\n * To avoid ambiguous results when strings in [strings] have characters in common, this method proceeds from\n * the beginning to the end of this string, and finds at each position the first element in [strings]\n * that matches this string at that position.\n */\npublic fun CharSequence.findAnyOf(strings: Collection<String>, startIndex: Int = 0, ignoreCase: Boolean = false): Pair<Int, String>? =\n   findAnyOf(strings, startIndex, ignoreCase, last = false)\n\n/**\n * Finds the last occurrence of any of the specified [strings] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param startIndex The index of character to start searching at. The search proceeds backward toward the beginning of the string.\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns A pair of an index of the last occurrence of matched string from [strings] and the string matched or `null` if none of [strings] are found.\n *\n * To avoid ambiguous results when strings in [strings] have characters in common, this method proceeds from\n * the end toward the beginning of this string, and finds at each position the first element in [strings]\n * that matches this string at that position.\n */\npublic fun CharSequence.findLastAnyOf(strings: Collection<String>, startIndex: Int = lastIndex, ignoreCase: Boolean = false): Pair<Int, String>? =\n   findAnyOf(strings, startIndex, ignoreCase, last = true)\n\n/**\n * Finds the index of the first occurrence of any of the specified [strings] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns An index of the first occurrence of matched string from [strings] or -1 if none of [strings] are found.\n *\n * To avoid ambiguous results when strings in [strings] have characters in common, this method proceeds from\n * the beginning to the end of this string, and finds at each

position the first element in [strings]\n * that matches this string at that position.\n */\npublic fun CharSequence.indexOfAny(strings: Collection<String>, startIndex: Int = 0, ignoreCase: Boolean = false): Int =\n findAnyOf(strings, startIndex, ignoreCase, last = false)?.first ?: -1\n\n/**\n * Finds the index of the last occurrence of any of the specified [strings] in this char sequence,\n * starting from the specified [startIndex] and optionally ignoring the case.\n *\n * @param startIndex The index of character to start searching at. The search proceeds backward toward the beginning of the string.\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns An index of the last occurrence of matched string from [strings] or -1 if none of [strings] are found.\n *\n * To avoid ambiguous results when strings in [strings] have characters in common, this method proceeds from\n * the end toward the beginning of this string, and finds at each position the first element in [strings]\n * that matches this string at that position.\n */\npublic fun CharSequence.lastIndexOfAny(strings: Collection<String>, startIndex: Int = lastIndex, ignoreCase: Boolean = false): Int =\n findAnyOf(strings, startIndex, ignoreCase, last = true)?.first ?: -1\n\n// indexOf\n\n/**\n * Returns the index within this string of the first occurrence of the specified character, starting from the specified [startIndex].\n *\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n * @returns An index of the first occurrence of [char] or -1 if none is found.\n */\npublic fun CharSequence.indexOf(char: Char, startIndex: Int = 0, ignoreCase: Boolean = false): Int {\n return if (ignoreCase || this !is String)\n indexOfAny(charArrayOf(char), startIndex, ignoreCase)\n else\n nativeIndexOf(char, startIndex)\n}\n\n/**\n * Returns the index within this char sequence of the first occurrence of the specified [string],\n * starting from the specified [startIndex].\n *\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns An index of the first occurrence of [string] or `-1` if none is found.\n */\npublic fun CharSequence.indexOf(string: String, startIndex: Int = 0, ignoreCase: Boolean = false): Int {\n return if (ignoreCase || this !is String)\n indexOf(string, startIndex, length, ignoreCase)\n else\n nativeIndexOf(string, startIndex)\n}\n\n/**\n * Returns the index within this char sequence of the last occurrence of the specified character,\n * starting from the specified [startIndex].\n *\n * @param startIndex The index of character to start searching at. The search proceeds backward toward the beginning of the string.\n * @param ignoreCase `true` to ignore character case when matching a character. By default `false`.\n * @returns An index of the first occurrence of [char] or -1 if none is found.\n */\npublic fun CharSequence.lastIndexOf(char: Char, startIndex: Int = lastIndex, ignoreCase: Boolean = false): Int {\n return if (ignoreCase || this !is String)\n lastIndexOfAny(charArrayOf(char), startIndex, ignoreCase)\n else\n nativeLastIndexOf(char, startIndex)\n}\n\n/**\n * Returns the index within this char sequence of the last occurrence of the specified [string],\n * starting from the specified [startIndex].\n *\n * @param startIndex The index of character to start searching at. The search proceeds backward toward the beginning of the string.\n * @param ignoreCase `true` to ignore character case when matching a string. By default `false`.\n * @returns An index of the first occurrence of [string] or -1 if none is found.\n */\npublic fun CharSequence.lastIndexOf(string: String, startIndex: Int = lastIndex, ignoreCase: Boolean = false): Int {\n return if (ignoreCase || this !is String)\n indexOf(string, startIndex, 0, ignoreCase, last = true)\n else\n nativeLastIndexOf(string, startIndex)\n}\n\n/**\n * Returns `true` if this char sequence contains the specified [other] sequence of characters as a substring.\n *\n * @param ignoreCase `true` to ignore character case when comparing strings. By default `false`.\n */\n@Suppress(\"INAPPLICABLE_OPERATOR_MODIFIER\")\npublic operator fun CharSequence.contains(other: CharSequence, ignoreCase: Boolean = false): Boolean =\n if (other is String)\n indexOf(other, ignoreCase = ignoreCase) >= 0\n else\n indexOf(other, 0, length, ignoreCase) >= 0\n\n\n/**\n * Returns `true` if this char sequence contains the specified character [char].\n *\n * @param ignoreCase `true` to ignore character case when comparing characters. By default `false`.\n */\n@Suppress(\"INAPPLICABLE_OPERATOR_MODIFIER\")\npublic operator fun CharSequence.contains(char: Char, ignoreCase: Boolean = false): Boolean =\n indexOf(char, ignoreCase = ignoreCase) >= 0\n\n/**\n * Returns `true` if this char sequence contains at least one match of the specified regular expression [regex].\n *\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun CharSequence.contains(regex: Regex): Boolean = regex.containsMatchIn(this)\n\n\n// rangesDelimitedBy\n\nprivate class DelimitedRangesSequence(private val

input: CharSequence, private val startIndex: Int, private val limit: Int, private val getNextMatch: CharSequence.(Int) -> Pair<Int, Int>?): Sequence<IntRange> {\n   override fun iterator(): Iterator<IntRange> = object : Iterator<IntRange> {\n   var nextState: Int = -1 // -1 for unknown, 0 for done, 1 for continue\n   var currentStartIndex: Int = startIndex.coerceIn(0, input.length)\n   var nextSearchIndex: Int = currentStartIndex\n   var nextItem: IntRange? = null\n   var counter: Int = 0\n\n   private fun calcNext() {\n   if (nextSearchIndex < 0) {\n   nextState = 0\n   nextItem = null\n   } else {\n   if (limit > 0 && ++counter >= limit || nextSearchIndex > input.length) {\n   nextItem = currentStartIndex..input.lastIndex\n   nextSearchIndex = -1\n   } else {\n   val match = input.getNextMatch(nextSearchIndex)\n   if (match == null) {\n   nextItem = currentStartIndex..input.lastIndex\n   nextSearchIndex = -1\n   } else {\n   val (index,length) = match\n   nextItem = currentStartIndex until index\n   currentStartIndex = index + length\n   nextSearchIndex = currentStartIndex + if (length == 0) 1 else 0\n   }\n   }\n   nextState = 1\n   }\n   }\n\n   override fun next(): IntRange {\n   if (nextState == -1)\n   calcNext()\n   if (nextState == 0)\n   throw NoSuchElementException()\n   val result = nextItem as IntRange\n   // Clean next to avoid keeping reference on yielded instance\n   nextItem = null\n   nextState = -1\n   return result\n   }\n\n   override fun hasNext(): Boolean {\n   if (nextState == -1)\n   calcNext()\n   return nextState == 1\n   }\n   }\n}\n\n/**\n * Returns a sequence of index ranges of substrings in this char sequence around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more characters to be used as delimiters.\n * @param startIndex The index to start searching delimiters from.\n * No range having its start value less than [startIndex] is returned.\n * [startIndex] is coerced to be non-negative and not greater than length of this string.\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return. Zero by default means no limit is set.\n */\nprivate fun CharSequence.rangesDelimitedBy(delimiters: CharArray, startIndex: Int = 0, ignoreCase: Boolean = false, limit: Int = 0): Sequence<IntRange> {\n   require(limit >= 0, { \"Limit must be non-negative, but was $limit.\" })\n\n   return DelimitedRangesSequence(this, startIndex, limit, { startIndex ->\n   indexOfAny(delimiters, startIndex, ignoreCase = ignoreCase).let { if (it < 0) null else it to 1 } })\n}\n\n\n/**\n * Returns a sequence of index ranges of substrings in this char sequence around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more strings to be used as delimiters.\n * @param startIndex The index to start searching delimiters from.\n * No range having its start value less than [startIndex] is returned.\n * [startIndex] is coerced to be non-negative and not greater than length of this string.\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return. Zero by default means no limit is set.\n *\n * To avoid ambiguous results when strings in [delimiters] have characters in common, this method proceeds from\n * the beginning to the end of this string, and finds at each position the first element in [delimiters]\n * that matches this string at that position.\n */\nprivate fun CharSequence.rangesDelimitedBy(delimiters: Array<out String>, startIndex: Int = 0, ignoreCase: Boolean = false, limit: Int = 0): Sequence<IntRange> {\n   require(limit >= 0, { \"Limit must be non-negative, but was $limit.\" })\n   val delimitersList = delimiters.asList()\n\n   return DelimitedRangesSequence(this, startIndex, limit, { startIndex -> findAnyOf(delimitersList, startIndex, ignoreCase = ignoreCase, last = false)?.let { it.first to it.second.length } })\n}\n\n\n// split\n\n/**\n * Splits this char sequence to a sequence of strings around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more strings to be used as delimiters.\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return. Zero by default means no limit is set.\n *\n * To avoid ambiguous results when strings in [delimiters] have characters in common, this method proceeds from\n * the beginning to the end of this string, and finds at each position the first element in [delimiters]\n * that matches this string at that position.\n */\npublic fun CharSequence.splitToSequence(vararg delimiters: String, ignoreCase: Boolean = false, limit: Int = 0): Sequence<String> =\n   rangesDelimitedBy(delimiters, ignoreCase = ignoreCase, limit = limit).map { substring(it) }\n\n/**\n * Splits this char sequence to a list of strings around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more strings to be used as delimiters.\n

* @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return. Zero by default means no limit is set.\n *\n * To avoid ambiguous results when strings in [delimiters] have characters in common, this method proceeds from\n * the beginning to the end of this string, and matches at each position the first element in [delimiters]\n * that is equal to a delimiter in this instance at that position.\n */\npublic fun CharSequence.split(vararg delimiters: String, ignoreCase: Boolean = false, limit: Int = 0): List<String> {\n   if (delimiters.size == 1) {\n   val delimiter = delimiters[0]\n   if (!delimiter.isEmpty()) {\n   return split(delimiter, ignoreCase, limit)\n   }\n   }\n\n   return rangesDelimitedBy(delimiters, ignoreCase = ignoreCase, limit = limit).asIterable().map { substring(it) }\n}\n\n/**\n * Splits this char sequence to a sequence of strings around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more characters to be used as delimiters.\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return.\n */\npublic fun CharSequence.splitToSequence(vararg delimiters: Char, ignoreCase: Boolean = false, limit: Int = 0): Sequence<String> =\n   rangesDelimitedBy(delimiters, ignoreCase = ignoreCase, limit = limit).map { substring(it) }\n\n/**\n * Splits this char sequence to a list of strings around occurrences of the specified [delimiters].\n *\n * @param delimiters One or more characters to be used as delimiters.\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return.\n */\npublic fun CharSequence.split(vararg delimiters: Char, ignoreCase: Boolean = false, limit: Int = 0): List<String> {\n   if (delimiters.size == 1) {\n   return split(delimiters[0].toString(), ignoreCase, limit)\n   }\n\n   return rangesDelimitedBy(delimiters, ignoreCase = ignoreCase, limit = limit).asIterable().map { substring(it) }\n}\n\n/**\n * Splits this char sequence to a list of strings around occurrences of the specified [delimiter].\n * This is specialized version of split which receives single non-empty delimiter and offers better performance\n *\n * @param delimiter String used as delimiter\n * @param ignoreCase `true` to ignore character case when matching a delimiter. By default `false`.\n * @param limit The maximum number of substrings to return.\n */\nprivate fun CharSequence.split(delimiter: String, ignoreCase: Boolean, limit: Int): List<String> {\n   require(limit >= 0, { \"Limit must be non-negative, but was $limit.\" })\n\n   var currentOffset = 0\n   var nextIndex = indexOf(delimiter, currentOffset, ignoreCase)\n   if (nextIndex == -1 || limit == 1) {\n   return listOf(this.toString())\n   }\n\n   val isLimited = limit > 0\n   val result = ArrayList<String>(if (isLimited) limit.coerceAtMost(10) else 10)\n   do {\n   result.add(substring(currentOffset, nextIndex))\n   currentOffset = nextIndex + delimiter.length\n   // Do not search for next occurrence if we're reaching limit\n   if (isLimited && result.size == limit - 1) break\n   nextIndex = indexOf(delimiter, currentOffset, ignoreCase)\n   } while (nextIndex != -1)\n\n   result.add(substring(currentOffset, length))\n   return result\n}\n\n/**\n * Splits this char sequence around matches of the given regular expression.\n *\n * @param limit Non-negative value specifying the maximum number of substrings to return.\n * Zero by default means no limit is set.\n */\n@kotlin.internal.InlineOnly\npublic inline fun CharSequence.split(regex: Regex, limit: Int = 0): List<String> = regex.split(this, limit)\n\n/**\n * Splits this char sequence to a sequence of lines delimited by any of the following character sequences: CRLF, LF or CR.\n */\npublic fun CharSequence.lineSequence(): Sequence<String> = splitToSequence(\"\\r\\n\", \"\\n\", \"\\r\")\n\n/**\n * Splits this char sequence to a list of lines delimited by any of the following character sequences: CRLF, LF or CR.\n */\npublic fun CharSequence.lines(): List<String> = lineSequence().toList()\n","package kotlin.text\n\nimport kotlin.js.RegExp\n\n@kotlin.internal.InlineOnly\npublic inline fun String.toUpperCase(): String = asDynamic().toUpperCase()\n\n@kotlin.internal.InlineOnly\npublic inline fun String.toLowerCase(): String = asDynamic().toLowerCase()\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeIndexOf(str: String, fromIndex: Int): Int = asDynamic().indexOf(str, fromIndex)\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeLastIndexOf(str: String, fromIndex: Int): Int = asDynamic().lastIndexOf(str, fromIndex)\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeStartsWith(s: String, position: Int): Boolean = asDynamic().startsWith(s, position)\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeEndsWith(s: String): Boolean = asDynamic().endsWith(s)\n\n@kotlin.internal.InlineOnly\npublic inline fun String.substring(startIndex: Int): String = asDynamic().substring(startIndex)\n\n@kotlin.internal.InlineOnly\npublic inline fun String.substring(startIndex:

Int, endIndex: Int): String = asDynamic().substring(startIndex, endIndex)\n\n@kotlin.internal.InlineOnly\npublic inline fun String.concat(str: String): String = asDynamic().concat(str)\n\n@kotlin.internal.InlineOnly\npublic inline fun String.match(regex: String): Array<String>? = asDynamic().match(regex)\n\n//native public fun String.trim(): String\n//TODO: String.replace to implement effective trimLeading and trimTrailing\n\n@Deprecated(\"Use length property instead.\", ReplaceWith(\"length\"), level = DeprecationLevel.ERROR)\n@kotlin.internal.InlineOnly\npublic inline val CharSequence.size: Int get() = length\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeReplace(pattern: RegExp, replacement: String): String = asDynamic().replace(pattern, replacement)\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.collections\n\nimport kotlin.internal.PlatformDependent\n\n/**\n * Classes that inherit from this interface can be represented as a sequence of elements that can\n * be iterated over.\n * @param T the type of element being iterated over. The iterator is covariant on its element type.\n */\npublic interface Iterable<out T> {\n   /**\n   * Returns an iterator over the elements of this object.\n   */\n   public operator fun iterator(): Iterator<T>\n}\n\n/**\n * Classes that inherit from this interface can be represented as a sequence of elements that can\n * be iterated over and that supports removing elements during iteration.\n * @param T the type of element being iterated over. The mutable iterator is invariant on its element type.\n */\npublic interface MutableIterable<out T> : Iterable<T> {\n   /**\n   * Returns an iterator over the elements of this sequence that supports removing elements during iteration.\n   */\n   override fun iterator(): MutableIterator<T>\n}\n\n/**\n * A generic collection of elements. Methods in this interface support only read-only access to the collection;\n * read/write access is supported through the [MutableCollection] interface.\n * @param E the type of elements contained in the collection. The collection is covariant on its element type.\n */\npublic interface Collection<out E> : Iterable<E> {\n   // Query Operations\n   /**\n   * Returns the size of the collection.\n   */\n   public val size: Int\n\n   /**\n   * Returns `true` if the collection is empty (contains no elements), `false` otherwise.\n   */\n   public fun isEmpty(): Boolean\n\n   /**\n   * Checks if the specified element is contained in this collection.\n   */\n   public operator fun contains(element: @UnsafeVariance E): Boolean\n\n   override fun iterator(): Iterator<E>\n\n   // Bulk Operations\n   /**\n   * Checks if all elements in the specified collection are contained in this collection.\n   */\n   public fun containsAll(elements: Collection<@UnsafeVariance E>): Boolean\n}\n\n/**\n * A generic collection of elements that supports adding and removing elements.\n *\n * @param E the type of elements contained in the collection. The mutable collection is invariant on its element type.\n */\npublic interface MutableCollection<E> : Collection<E>, MutableIterable<E> {\n   // Query Operations\n   override fun iterator(): MutableIterator<E>\n\n   // Modification Operations\n   /**\n   * Adds the specified element to the collection.\n   *\n   * @return `true` if the element has been added, `false` if the collection does not support duplicates\n   * and the element is already contained in the collection.\n   */\n   public fun add(element: E): Boolean\n\n   /**\n   * Removes a single instance of the specified element from this\n   * collection, if it is present.\n   *\n   * @return `true` if the element has been successfully removed; `false` if it was\n   * not present in the collection.\n   */\n   public fun remove(element: E): Boolean\n\n   // Bulk Modification Operations\n   /**\n   * Adds all of the elements in the specified collection to this collection.\n   *\n   * @return `true` if any of the specified elements was added to the collection, `false` if the collection was not modified.\n   */\n   public fun addAll(elements: Collection<E>): Boolean\n\n   /**\n   * Removes all of this collection's elements that are also contained in the specified collection.\n   *\n   * @return `true` if any of the specified elements was removed from the collection, `false` if the collection was not modified.\n   */\n   public fun removeAll(elements: Collection<E>): Boolean\n\n   /**\n   * Retains only the elements in this collection that are contained in the specified collection.\n   *\n   * @return `true` if any element was removed from the collection, `false` if the collection was not modified.\n   */\n   public fun retainAll(elements: Collection<E>): Boolean\n\n   /**\n   *

Removes all elements from this collection.\n   */\n   public fun clear(): Unit\n}\n\n/**\n * A generic ordered collection of elements. Methods in this interface support only read-only access to the list;\n * read/write access is supported through the [MutableList] interface.\n * @param E the type of elements contained in the list. The list is covariant on its element type.\n */\npublic interface List<out E> : Collection<E> {\n   // Query Operations\n   override val size: Int\n\n   override fun isEmpty(): Boolean\n   override fun contains(element: @UnsafeVariance E): Boolean\n   override fun iterator(): Iterator<E>\n\n   // Bulk Operations\n   override fun containsAll(elements: Collection<@UnsafeVariance E>): Boolean\n\n   // Positional Access Operations\n   /**\n   * Returns the element at the specified index in the list.\n   */\n   public operator fun get(index: Int): E\n\n   // Search Operations\n   /**\n   * Returns the index of the first occurrence of the specified element in the list, or -1 if the specified\n   * element is not contained in the list.\n   */\n   public fun indexOf(element: @UnsafeVariance E): Int\n\n   /**\n   * Returns the index of the last occurrence of the specified element in the list, or -1 if the specified\n   * element is not contained in the list.\n   */\n   public fun lastIndexOf(element: @UnsafeVariance E): Int\n\n   // List Iterators\n   /**\n   * Returns a list iterator over the elements in this list (in proper sequence).\n   */\n   public fun listIterator(): ListIterator<E>\n\n   /**\n   * Returns a list iterator over the elements in this list (in proper sequence), starting at the specified [index].\n   */\n   public fun listIterator(index: Int): ListIterator<E>\n\n   // View\n   /**\n   * Returns a view of the portion of this list between the specified [fromIndex] (inclusive) and [toIndex] (exclusive).\n   * The returned list is backed by this list, so non-structural changes in the returned list are reflected in this list, and vice-versa.\n   *\n   * Structural changes in the base list make the behavior of the view undefined.\n   */\n   public fun subList(fromIndex: Int, toIndex: Int): List<E>\n}\n\n/**\n * A generic ordered collection of elements that supports adding and removing elements.\n * @param E the type of elements contained in the list. The mutable list is invariant on its element type.\n */\npublic interface MutableList<E> : List<E>, MutableCollection<E> {\n   // Modification Operations\n   override fun add(element: E): Boolean\n\n   override fun remove(element: E): Boolean\n\n   // Bulk Modification Operations\n   override fun addAll(elements: Collection<E>): Boolean\n\n   /**\n   * Inserts all of the elements in the specified collection [elements] into this list at the specified [index].\n   *\n   * @return `true` if the list was changed as the result of the operation.\n   */\n   public fun addAll(index: Int, elements: Collection<E>): Boolean\n\n   override fun removeAll(elements: Collection<E>): Boolean\n   override fun retainAll(elements: Collection<E>): Boolean\n   override fun clear(): Unit\n\n   // Positional Access Operations\n   /**\n   * Replaces the element at the specified position in this list with the specified element.\n   *\n   * @return the element previously at the specified position.\n   */\n   public operator fun set(index: Int, element: E): E\n\n   /**\n   * Inserts an element into the list at the specified [index].\n   */\n   public fun add(index: Int, element: E): Unit\n\n   /**\n   * Removes an element at the specified [index] from the list.\n   *\n   * @return the element that has been removed.\n   */\n   public fun removeAt(index: Int): E\n\n   // List Iterators\n   override fun listIterator(): MutableListIterator<E>\n\n   override fun listIterator(index: Int): MutableListIterator<E>\n\n   // View\n   override fun subList(fromIndex: Int, toIndex: Int): MutableList<E>\n}\n\n/**\n * A generic unordered collection of elements that does not support duplicate elements.\n * Methods in this interface support only read-only access to the set;\n * read/write access is supported through the [MutableSet] interface.\n * @param E the type of elements contained in the set. The set is covariant on its element type.\n */\npublic interface Set<out E> : Collection<E> {\n   // Query Operations\n   override val size: Int\n\n   override fun isEmpty(): Boolean\n   override fun contains(element: @UnsafeVariance E): Boolean\n   override fun iterator(): Iterator<E>\n\n   // Bulk Operations\n   override fun containsAll(elements: Collection<@UnsafeVariance E>): Boolean\n}\n\n/**\n * A generic unordered collection of elements that does not support duplicate elements, and supports\n * adding and removing elements.\n * @param E the type of elements contained in the set. The mutable set is invariant on its element type.\n */\npublic interface MutableSet<E> : Set<E>, MutableCollection<E> {\n   // Query Operations\n   override fun iterator(): MutableIterator<E>\n\n   // Modification Operations\n   override fun add(element: E): Boolean\n\n   override fun remove(element: E): Boolean\n\n   // Bulk Modification Operations\n   override fun addAll(elements: Collection<E>): Boolean\n\n   override fun removeAll(elements: Collection<E>): Boolean\n   override fun retainAll(elements: Collection<E>): Boolean\n   override fun clear(): Unit\n}\n\n/**\n * A collection that holds pairs of objects (keys and values) and

supports efficiently retrieving\n * the value corresponding to each key. Map keys are unique; the map holds only one value for each key.\n * Methods in this interface support only read-only access to the map; read-write access is supported through\n * the [MutableMap] interface.\n * @param K the type of map keys. The map is invariant on its key type, as it\n *   can accept key as a parameter (of [containsKey] for example) and return it in [keys] set.\n * @param V the type of map values. The map is covariant on its value type.\n */\npublic interface Map<K, out V> {\n   // Query Operations\n   /**\n   * Returns the number of key/value pairs in the map.\n   */\n   public val size: Int\n\n   /**\n   * Returns `true` if the map is empty (contains no elements), `false` otherwise.\n   */\n   public fun isEmpty(): Boolean\n\n   /**\n   * Returns `true` if the map contains the specified [key].\n   */\n   public fun containsKey(key: K): Boolean\n\n   /**\n   * Returns `true` if the map maps one or more keys to the specified [value].\n   */\n   public fun containsValue(value: @UnsafeVariance V): Boolean\n\n   /**\n   * Returns the value corresponding to the given [key], or `null` if such a key is not present in the map.\n   */\n   public operator fun get(key: K): V?\n\n   /**\n   * Returns the value corresponding to the given [key], or [defaultValue] if such a key is not present in the map.\n   *\n   * @since JDK 1.8\n   */\n   @SinceKotlin(\"1.1\")\n   @PlatformDependent\n   public fun getOrDefault(key: K, defaultValue: @UnsafeVariance V): V {\n   // See default implementation in JDK sources\n   return null as V\n   }\n\n   // Views\n   /**\n   * Returns a read-only [Set] of all keys in this map.\n   */\n   public val keys: Set<K>\n\n   /**\n   * Returns a read-only [Collection] of all values in this map. Note that this collection may contain duplicate values.\n   */\n   public val values: Collection<V>\n\n   /**\n   * Returns a read-only [Set] of all key/value pairs in this map.\n   */\n   public val entries: Set<Map.Entry<K, V>>\n\n   /**\n   * Represents a key/value pair held by a [Map].\n   */\n   public interface Entry<out K, out V> {\n   /**\n   * Returns the key of this key/value pair.\n   */\n   public val key: K\n\n   /**\n   * Returns the value of this key/value pair.\n   */\n   public val value: V\n   }\n}\n\n/**\n * A modifiable collection that holds pairs of objects (keys and values) and supports efficiently retrieving\n * the value corresponding to each key. Map keys are unique; the map holds only one value for each key.\n * @param K the type of map keys. The map is invariant on its key type.\n * @param V the type of map values. The mutable map is invariant on its value type.\n */\npublic interface MutableMap<K, V> : Map<K, V> {\n   // Modification Operations\n   /**\n   * Associates the specified [value] with the specified [key] in the map.\n   *\n   * @return the previous value associated with the key, or `null` if the key was not present in the map.\n   */\n   public fun put(key: K, value: V): V?\n\n   /**\n   * Removes the specified key and its corresponding value from this map.\n   *\n   * @return the previous value associated with the key, or `null` if the key was not present in the map.\n   */\n   public fun remove(key: K): V?\n\n   /**\n   * Removes the entry for the specified key only if it is mapped to the specified value.\n   *\n   * @return true if entry was removed\n   */\n   @SinceKotlin(\"1.1\")\n   @PlatformDependent\n   public fun remove(key: K, value: V): Boolean {\n   // See default implementation in JDK sources\n   return true\n   }\n\n   // Bulk Modification Operations\n   /**\n   * Updates this map with key/value pairs from the specified map [from].\n   */\n   public fun putAll(from: Map<out K, V>): Unit\n\n   /**\n   * Removes all elements from this map.\n   */\n   public fun clear(): Unit\n\n   // Views\n   /**\n   * Returns a [MutableSet] of all keys in this map.\n   */\n   override val keys: MutableSet<K>\n\n   /**\n   * Returns a [MutableCollection] of all values in this map. Note that this collection may contain duplicate values.\n   */\n   override val values: MutableCollection<V>\n\n   /**\n   * Returns a [MutableSet] of all key/value pairs in this map.\n   */\n   override val entries: MutableSet<MutableMap.MutableEntry<K, V>>\n\n   /**\n   * Represents a key/value pair held by a [MutableMap].\n   */\n   public interface MutableEntry<K, V> : Map.Entry<K, V> {\n   /**\n   * Changes the value associated with the key of this entry.\n   *\n   * @return the previous value corresponding to the key.\n   */\n   public fun setValue(newValue: V): V\n   }\n}\n","/*\n * Copyright 2010-2018 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// Auto-generated file. DO NOT

EDIT!\n\npackage kotlin.collections\n\n/** An iterator over a sequence of values of type `Byte`. */\npublic abstract class ByteIterator : Iterator<Byte> {\n   override final fun next() = nextByte()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextByte(): Byte\n}\n\n/** An iterator over a sequence of values of type `Char`. */\npublic abstract class CharIterator : Iterator<Char> {\n   override final fun next() = nextChar()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextChar(): Char\n}\n\n/** An iterator over a sequence of values of type `Short`. */\npublic abstract class ShortIterator : Iterator<Short> {\n   override final fun next() = nextShort()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextShort(): Short\n}\n\n/** An iterator over a sequence of values of type `Int`. */\npublic abstract class IntIterator : Iterator<Int> {\n   override final fun next() = nextInt()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextInt(): Int\n}\n\n/** An iterator over a sequence of values of type `Long`. */\npublic abstract class LongIterator : Iterator<Long> {\n   override final fun next() = nextLong()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextLong(): Long\n}\n\n/** An iterator over a sequence of values of type `Float`. */\npublic abstract class FloatIterator : Iterator<Float> {\n   override final fun next() = nextFloat()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextFloat(): Float\n}\n\n/** An iterator over a sequence of values of type `Double`. */\npublic abstract class DoubleIterator : Iterator<Double> {\n   override final fun next() = nextDouble()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextDouble(): Double\n}\n\n/** An iterator over a sequence of values of type `Boolean`. */\npublic abstract class BooleanIterator : Iterator<Boolean> {\n   override final fun next() = nextBoolean()\n\n   /** Returns the next value in the sequence without boxing. */\n   public abstract fun nextBoolean(): Boolean\n}\n","/*\n * Copyright 2010-2018 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// Auto-generated file. DO NOT EDIT!\n\npackage kotlin.ranges\n\n/**\n * An iterator over a progression of values of type `Char`.\n * @property step the number by which the value is incremented on each step.\n */\ninternal class CharProgressionIterator(first: Char, last: Char, val step: Int) : CharIterator() {\n   private val finalElement = last.toInt()\n   private var hasNext: Boolean = if (step > 0) first <= last else first >= last\n   private var next = if (hasNext) first.toInt() else finalElement\n\n   override fun hasNext(): Boolean = hasNext\n\n   override fun nextChar(): Char {\n   val value = next\n   if (value == finalElement) {\n   if (!hasNext) throw kotlin.NoSuchElementException()\n   hasNext = false\n   }\n   else {\n   next += step\n   }\n   return value.toChar()\n   }\n}\n\n/**\n * An iterator over a progression of values of type `Int`.\n * @property step the number by which the value is incremented on each step.\n */\ninternal class IntProgressionIterator(first: Int, last: Int, val step: Int) : IntIterator() {\n   private val finalElement = last\n   private var hasNext: Boolean = if (step > 0) first <= last else first >= last\n   private var next = if (hasNext) first else finalElement\n\n   override fun hasNext(): Boolean = hasNext\n\n   override fun nextInt(): Int {\n   val value = next\n   if (value == finalElement) {\n   if (!hasNext) throw kotlin.NoSuchElementException()\n   hasNext = false\n   }\n   else {\n   next += step\n   }\n   return value\n   }\n}\n\n/**\n * An iterator over a progression of values of type `Long`.\n * @property step the number by which the value is incremented on each step.\n */\ninternal class LongProgressionIterator(first: Long, last: Long, val step: Long) : LongIterator() {\n   private val finalElement = last\n   private var hasNext: Boolean = if (step > 0) first <= last else first >= last\n   private var next = if (hasNext) first else finalElement\n\n   override fun hasNext(): Boolean = hasNext\n\n   override fun nextLong(): Long {\n   val value = next\n   if (value == finalElement) {\n   if (!hasNext) throw kotlin.NoSuchElementException()\n   hasNext = false\n   }\n   else {\n   next += step\n   }\n   return value\n   }\n}\n","/*\n * Copyright 2010-2018 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n *

http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// Auto-generated file. DO NOT EDIT!\n\npackage kotlin.ranges\n\nimport kotlin.internal.getProgressionLastElement\n\n/**\n * A progression of values of type `Char`.\n */\npublic open class CharProgression\n   internal constructor\n   (\n   start: Char,\n   endInclusive: Char,\n   step: Int\n   ) : Iterable<Char> {\n   init {\n   if (step == 0) throw kotlin.IllegalArgumentException(\"Step must be non-zero\")\n   }\n\n   /**\n   * The first element in the progression.\n   */\n   public val first: Char = start\n\n   /**\n   * The last element in the progression.\n   */\n   public val last: Char = getProgressionLastElement(start.toInt(), endInclusive.toInt(), step).toChar()\n\n   /**\n   * The step of the progression.\n   */\n   public val step: Int = step\n\n   override fun iterator(): CharIterator = CharProgressionIterator(first, last, step)\n\n   /** Checks if the progression is empty. */\n   public open fun isEmpty(): Boolean = if (step > 0) first > last else first < last\n\n   override fun equals(other: Any?): Boolean =\n   other is CharProgression && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last && step == other.step)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * (31 * first.toInt() + last.toInt()) + step)\n\n   override fun toString(): String = if (step > 0) \"$first..$last step $step\" else \"$first downTo $last step ${-step}\"\n\n   companion object {\n   /**\n   * Creates CharProgression within the specified bounds of a closed range.\n\n   * The progression starts with the [rangeStart] value and goes toward the [rangeEnd] value not excluding it, with the specified [step].\n   * In order to go backwards the [step] must be negative.\n   */\n   public fun fromClosedRange(rangeStart: Char, rangeEnd: Char, step: Int): CharProgression = CharProgression(rangeStart, rangeEnd, step)\n   }\n}\n\n/**\n * A progression of values of type `Int`.\n */\npublic open class IntProgression\n   internal constructor\n   (\n   start: Int,\n   endInclusive: Int,\n   step: Int\n   ) : Iterable<Int> {\n   init {\n   if (step == 0) throw kotlin.IllegalArgumentException(\"Step must be non-zero\")\n   }\n\n   /**\n   * The first element in the progression.\n   */\n   public val first: Int = start\n\n   /**\n   * The last element in the progression.\n   */\n   public val last: Int = getProgressionLastElement(start.toInt(), endInclusive.toInt(), step).toInt()\n\n   /**\n   * The step of the progression.\n   */\n   public val step: Int = step\n\n   override fun iterator(): IntIterator = IntProgressionIterator(first, last, step)\n\n   /** Checks if the progression is empty. */\n   public open fun isEmpty(): Boolean = if (step > 0) first > last else first < last\n\n   override fun equals(other: Any?): Boolean =\n   other is IntProgression && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last && step == other.step)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * (31 * first + last) + step)\n\n   override fun toString(): String = if (step > 0) \"$first..$last step $step\" else \"$first downTo $last step ${-step}\"\n\n   companion object {\n   /**\n   * Creates IntProgression within the specified bounds of a closed range.\n\n   * The progression starts with the [rangeStart] value and goes toward the [rangeEnd] value not excluding it, with the specified [step].\n   * In order to go backwards the [step] must be negative.\n   */\n   public fun fromClosedRange(rangeStart: Int, rangeEnd: Int, step: Int): IntProgression = IntProgression(rangeStart, rangeEnd, step)\n   }\n}\n\n/**\n * A progression of values of type `Long`.\n */\npublic open class LongProgression\n   internal constructor\n   (\n   start: Long,\n   endInclusive: Long,\n   step: Long\n   ) : Iterable<Long> {\n   init {\n   if (step == 0L) throw kotlin.IllegalArgumentException(\"Step must be non-zero\")\n   }\n\n   /**\n   * The first element in the progression.\n   */\n   public val first: Long = start\n\n   /**\n   * The last element in the progression.\n   */\n   public val last: Long = getProgressionLastElement(start.toLong(), endInclusive.toLong(), step).toLong()\n\n   /**\n   * The step of the progression.\n   */\n   public val step: Long = step\n\n   override fun iterator(): LongIterator = LongProgressionIterator(first, last, step)\n\n   /** Checks if the progression is empty. */\n   public open fun isEmpty(): Boolean = if (step > 0) first > last else first < last\n\n   override fun equals(other: Any?): Boolean =\n   other is LongProgression && (isEmpty() && other.isEmpty() ||\n   first == other.first && last == other.last && step == other.step)\n\n   override fun hashCode(): Int =\n   if (isEmpty()) -1 else (31 * (31 * (first xor (first ushr 32)) + (last xor (last ushr 32))) + (step xor (step ushr 32))).toInt()\n\n   override fun toString(): String = if (step > 0)

\"$first..$last step $step\" else \"$first downTo $last step ${-step}\"\n\n   companion object {\n   /**\n   * Creates LongProgression within the specified bounds of a closed range.\n\n   * The progression starts with the [rangeStart] value and goes toward the [rangeEnd] value not excluding it, with the specified [step].\n   * In order to go backwards the [step] must be negative.\n   */\n   public fun fromClosedRange(rangeStart: Long, rangeEnd: Long, step: Long): LongProgression = LongProgression(rangeStart, rangeEnd, step)\n   }\n}\n\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.ranges\n\n/**\n * Represents a range of values (for example, numbers or characters).\n * See the [Kotlin language documentation](http://kotlinlang.org/docs/reference/ranges.html) for more information.\n */\npublic interface ClosedRange<T: Comparable<T>> {\n   /**\n   * The minimum value in the range.\n   */\n   public val start: T\n\n   /**\n   * The maximum value in the range (inclusive).\n   */\n   public val endInclusive: T\n\n   /**\n   * Checks whether the specified [value] belongs to the range.\n   */\n   public operator fun contains(value: T): Boolean = value >= start && value <= endInclusive\n\n   /**\n   * Checks whether the range is empty.\n   */\n   public fun isEmpty(): Boolean = start > endInclusive\n}\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin\n\n/**\n * The type with only one value: the Unit object. This type corresponds to the `void` type in Java.\n */\npublic object Unit {\n   override fun toString() = \"kotlin.Unit\"\n}\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.annotation\n\nimport kotlin.annotation.AnnotationTarget.*\n\n/**\n * Contains the list of code elements which are the possible annotation targets\n */\npublic enum class AnnotationTarget {\n   /** Class, interface or object, annotation class is also included */\n   CLASS,\n   /** Annotation class only */\n   ANNOTATION_CLASS,\n   /** Generic type parameter (unsupported yet) */\n   TYPE_PARAMETER,\n   /** Property */\n   PROPERTY,\n   /** Field, including property's backing field */\n   FIELD,\n   /** Local variable */\n   LOCAL_VARIABLE,\n   /** Value parameter of a function or a constructor */\n   VALUE_PARAMETER,\n   /** Constructor only (primary or secondary) */\n   CONSTRUCTOR,\n   /** Function (constructors are not included) */\n   FUNCTION,\n   /** Property getter only */\n   PROPERTY_GETTER,\n   /** Property setter only */\n   PROPERTY_SETTER,\n   /** Type usage */\n   TYPE,\n   /** Any expression */\n   EXPRESSION,\n   /** File */\n   FILE,\n   /** Type alias */\n   @SinceKotlin(\"1.1\")\n   TYPEALIAS\n}\n\n/**\n * Contains the list of possible annotation's retentions.\n *\n * Determines how an annotation is stored in binary output.\n */\npublic enum class AnnotationRetention {\n   /** Annotation isn't stored in binary output */\n   SOURCE,\n   /** Annotation is stored in binary output, but invisible for reflection */\n   BINARY,\n   /** Annotation is stored in binary output and visible for reflection (default retention) */\n   RUNTIME\n}\n\n/**\n * This meta-annotation indicates the kinds of code elements which are possible targets of an annotation.\n *\n * If the target meta-annotation is not present on an annotation declaration, the annotation is applicable to the following elements:\n * [CLASS], [PROPERTY], [FIELD],

[LOCAL_VARIABLE], [VALUE_PARAMETER], [CONSTRUCTOR], [FUNCTION], [PROPERTY_GETTER], [PROPERTY_SETTER].\n *\n * @property allowedTargets list of allowed annotation targets\n */\n@Target(AnnotationTarget.ANNOTATION_CLASS)\n@MustBeDocumented\npublic annotation class Target(vararg val allowedTargets: AnnotationTarget)\n\n/**\n * This meta-annotation determines whether an annotation is stored in binary output and visible for reflection. By default, both are true.\n *\n * @property value necessary annotation retention (RUNTIME, BINARY or SOURCE)\n */\n@Target(AnnotationTarget.ANNOTATION_CLASS)\npublic annotation class Retention(val value: AnnotationRetention = AnnotationRetention.RUNTIME)\n\n/**\n * This meta-annotation determines that an annotation is applicable twice or more on a single code element\n */\n@Target(AnnotationTarget.ANNOTATION_CLASS)\npublic annotation class Repeatable\n\n/**\n * This meta-annotation determines that an annotation is a part of public API and therefore should be included in the generated\n * documentation for the element to which the annotation is applied.\n */\n@Target(AnnotationTarget.ANNOTATION_CLASS)\npublic annotation class MustBeDocumented\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.internal\n\n/**\n * Specifies that the corresponding type parameter is not used for unsafe operations such as casts or 'is' checks\n * That means it's completely safe to use generic types as argument for such parameter.\n */\n@Target(AnnotationTarget.TYPE_PARAMETER)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class PureReifiable\n\n/**\n * Specifies that the corresponding built-in method exists depending on platform.\n * Current implementation for JVM looks whether method with same JVM descriptor exists in the module JDK.\n * For example MutableMap.remove(K, V) available only if corresponding\n * method 'java/util/Map.remove(Ljava/lang/Object;Ljava/lang/Object;)Z' is defined in JDK (i.e. for major versions >= 8)\n */\n@Target(AnnotationTarget.FUNCTION)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class PlatformDependent\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.internal\n\n\n// a mod b (in arithmetical sense)\nprivate fun mod(a: Int, b: Int): Int {\n   val mod = a % b\n   return if (mod >= 0) mod else mod + b\n}\n\nprivate fun mod(a: Long, b: Long): Long {\n   val mod = a % b\n   return if (mod >= 0) mod else mod + b\n}\n\n// (a - b) mod c\nprivate fun differenceModulo(a: Int, b: Int, c: Int): Int {\n   return mod(mod(a, c) - mod(b, c), c)\n}\n\nprivate fun differenceModulo(a: Long, b: Long, c: Long): Long {\n   return mod(mod(a, c) - mod(b, c), c)\n}\n\n/**\n * Calculates the final element of a bounded arithmetic progression, i.e. the last element of the progression which is in the range\n * from [start] to [end] in case of a positive [step], or from [end] to [start] in case of a negative\n * [step].\n *\n * No validation on passed parameters is performed. The given parameters should satisfy the condition: either\n * `step > 0` and `start >= end`, or `step < 0` and`start >= end`.\n * @param start first element of the progression\n * @param end ending bound for the progression\n * @param step increment, or difference of successive elements in the progression\n * @return the final element of the progression\n * @suppress\n */\n@PublishedApi\ninternal fun getProgressionLastElement(start: Int, end: Int, step: Int): Int {\n   if (step > 0) {\n   return end - differenceModulo(end, start, step)\n   }\n   else if (step < 0) {\n   return end + differenceModulo(start, end, -step)\n   }\n   else {\n   throw kotlin.IllegalArgumentException(\"Step is zero.\")\n   }\n}\n\n/**\n * Calculates the final element of a bounded arithmetic progression, i.e. the last element of the progression which is in the range\n

* from [start] to [end] in case of a positive [step], or from [end] to [start] in case of a negative\n * [step].\n *\n * No validation on passed parameters is performed. The given parameters should satisfy the condition: either\n * `step > 0` and `start >= end`, or `step < 0` and`start >= end`.\n * @param start first element of the progression\n * @param end ending bound for the progression\n * @param step increment, or difference of successive elements in the progression\n * @return the final element of the progression\n * @suppress\n */\n@PublishedApi\ninternal fun getProgressionLastElement(start: Long, end: Long, step: Long): Long {\n   if (step > 0) {\n   return end - differenceModulo(end, start, step)\n   }\n   else if (step < 0) {\n   return end + differenceModulo(start, end, -step)\n   }\n   else {\n   throw kotlin.IllegalArgumentException(\"Step is zero.\")\n   }\n}\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect\n\n/**\n * Represents a parameter passed to a function or a property getter/setter,\n * including `this` and extension receiver parameters.\n */\npublic interface KParameter : KAnnotatedElement {\n   /**\n   * 0-based index of this parameter in the parameter list of its containing callable.\n   */\n   public val index: Int\n\n   /**\n   * Name of this parameter as it was declared in the source code,\n   * or `null` if the parameter has no name or its name is not available at runtime.\n   * Examples of nameless parameters include `this` instance for member functions,\n   * extension receiver for extension functions or properties, parameters of Java methods\n   * compiled without the debug information, and others.\n   */\n   public val name: String?\n\n   /**\n   * Type of this parameter. For a `vararg` parameter, this is the type of the corresponding array,\n   * not the individual element.\n   */\n   public val type: KType\n\n   /**\n   * Kind of this parameter.\n   */\n   public val kind: Kind\n\n   /**\n   * Kind represents a particular position of the parameter declaration in the source code,\n   * such as an instance, an extension receiver parameter or a value parameter.\n   */\n   public enum class Kind {\n   /** Instance required to make a call to the member, or an outer class instance for an inner class constructor. */\n   INSTANCE,\n\n   /** Extension receiver of an extension function or property. */\n   EXTENSION_RECEIVER,\n\n   /** Ordinary named value parameter. */\n   VALUE,\n   }\n\n   /**\n   * `true` if this parameter is optional and can be omitted when making a call via [KCallable.callBy], or `false` otherwise.\n   *\n   * A parameter is optional in any of the two cases:\n   * 1. The default value is provided at the declaration of this parameter.\n   * 2. The parameter is declared in a member function and one of the corresponding parameters in the super functions is optional.\n   */\n   public val isOptional: Boolean\n\n   /**\n   * `true` if this parameter is `vararg`.\n   * See the [Kotlin language documentation](https://kotlinlang.org/docs/reference/functions.html#variable-number-of-arguments-varargs)\n   * for more information.\n   */\n   @SinceKotlin(\"1.1\")\n   public val isVararg: Boolean\n}\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect\n\n/**\n * Represents a type. Type is usually either a class with optional type arguments,\n * or a type parameter of some declaration, plus nullability.\n */\npublic interface KType {\n   /**\n   * The declaration of the classifier used in this type.\n   * For example, in the type `List<String>` the classifier would be the [KClass] instance for [List].\n   *\n   * Returns `null` if this type is not denotable in Kotlin, for example if it is an intersection type.\n   */\n   @SinceKotlin(\"1.1\")\n   public val classifier: KClassifier?\n\n   /**\n   * Type arguments passed for the parameters of the classifier in this type.\n   * For example, in the type `Array<out Number>` the only type argument is `out Number`.\n   *\n   * In case this type is based on an inner class, the returned list contains the type arguments provided for the innermost class first,\n   * then its outer class, and so on.\n   * For example, in the type

`Outer<A, B>.Inner<C, D>` the returned list is `[C, D, A, B]`.\n   */\n   @SinceKotlin(\"1.1\")\n   public val arguments: List<KTypeProjection>\n\n   /**\n   * `true` if this type was marked nullable in the source code.\n   *\n   * For Kotlin types, it means that `null` value is allowed to be represented by this type.\n   * In practice it means that the type was declared with a question mark at the end.\n   * For non-Kotlin types, it means the type or the symbol which was declared with this type\n   * is annotated with a runtime-retained nullability annotation such as [javax.annotation.Nullable].\n   *\n   * Note that even if [isMarkedNullable] is false, values of the type can still be `null`.\n   * This may happen if it is a type of the type parameter with a nullable upper bound:\n   *\n   * ```\n   * fun <T> foo(t: T) {\n   *   // isMarkedNullable == false for t's type, but t can be null here when T = \"Any?\"\n   * }\n   * ```\n   */\n   public val isMarkedNullable: Boolean\n}\n\n/**\n * Represents a type projection. Type projection is usually the argument to another type in a type usage.\n * For example, in the type `Array<out Number>`, `out Number` is the covariant projection of the type represented by the class `Number`.\n *\n * Type projection is either the star projection, or an entity consisting of a specific type plus optional variance.\n *\n * See the [Kotlin language documentation](http://kotlinlang.org/docs/reference/generics.html#type-projections)\n * for more information.\n */\n@SinceKotlin(\"1.1\")\npublic data class KTypeProjection constructor(\n   /**\n   * The use-site variance specified in the projection, or `null` if this is a star projection.\n   */\n   public val variance: KVariance?,\n   /**\n   * The type specified in the projection, or `null` if this is a star projection.\n   */\n   public val type: KType?\n) {\n   public companion object {\n   /**\n   * Star projection, denoted by the `*` character.\n   * For example, in the type `KClass<*>`, `*` is the star projection.\n   * See the [Kotlin language documentation](http://kotlinlang.org/docs/reference/generics.html#star-projections)\n   * for more information.\n   */\n   public val STAR: KTypeProjection = KTypeProjection(null, null)\n\n   /**\n   * Creates an invariant projection of a given type. Invariant projection is just the type itself,\n   * without any use-site variance modifiers applied to it.\n   * For example, in the type `Set<String>`, `String` is an invariant projection of the type represented by the class `String`.\n   */\n   public fun invariant(type: KType): KTypeProjection =\n   KTypeProjection(KVariance.INVARIANT, type)\n\n   /**\n   * Creates a contravariant projection of a given type, denoted by the `in` modifier applied to a type.\n   * For example, in the type `MutableList<in Number>`, `in Number` is a contravariant projection of the type of class `Number`.\n   */\n   public fun contravariant(type: KType): KTypeProjection =\n   KTypeProjection(KVariance.IN, type)\n\n   /**\n   * Creates a covariant projection of a given type, denoted by the `out` modifier applied to a type.\n   * For example, in the type `Array<out Number>`, `out Number` is a covariant projection of the type of class `Number`.\n   */\n   public fun covariant(type: KType): KTypeProjection =\n   KTypeProjection(KVariance.OUT, type)\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect\n\n/**\n * Represents variance applied to a type parameter on the declaration site (*declaration-site variance*),\n * or to a type in a projection (*use-site variance*).\n *\n * See the [Kotlin language documentation](https://kotlinlang.org/docs/reference/generics.html#variance)\n * for more information.\n *\n * @see [KTypeParameter.variance]\n * @see [KTypeProjection]\n */\n@SinceKotlin(\"1.1\")\nenum class KVariance {\n   /**\n   * The affected type parameter or type is *invariant*, which means it has no variance applied to it.\n   */\n   INVARIANT,\n\n   /**\n   * The affected type parameter or type is *contravariant*. Denoted by the `in` modifier in the source code.\n   */\n   IN,\n\n   /**\n   * The affected type parameter or type is *covariant*. Denoted by the `out` modifier in the source code.\n   */\n   OUT,\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES

OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect\n\n/**\n * Visibility is an aspect of a Kotlin declaration regulating where that declaration is accessible in the source code.\n * Visibility can be changed with one of the following modifiers: `public`, `protected`, `internal`, `private`.\n *\n * Note that some Java visibilities such as package-private and protected (which also gives access to items from the same package)\n * cannot be represented in Kotlin, so there's no [KVisibility] value corresponding to them.\n *\n * See the [Kotlin language documentation](https://kotlinlang.org/docs/reference/visibility-modifiers.html)\n * for more information.\n */\n@SinceKotlin(\"1.1\")\nenum class KVisibility {\n   /**\n   * Visibility of declarations marked with the `public` modifier, or with no modifier at all.\n   */\n   PUBLIC,\n\n   /**\n   * Visibility of declarations marked with the `protected` modifier.\n   */\n   PROTECTED,\n\n   /**\n   * Visibility of declarations marked with the `internal` modifier.\n   */\n   INTERNAL,\n\n   /**\n   * Visibility of declarations marked with the `private` modifier.\n   */\n   PRIVATE,\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the read-only [Collection] interface.\n *\n* @param E the type of elements contained in the collection. The collection is covariant on its element type.\n */\n@SinceKotlin(\"1.1\")\npublic abstract class AbstractCollection<out E> protected constructor() : Collection<E> {\n   abstract override val size: Int\n   abstract override fun iterator(): Iterator<E>\n\n   override fun contains(element: @UnsafeVariance E): Boolean = any { it == element }\n\n   override fun containsAll(elements: Collection<@UnsafeVariance E>): Boolean =\n   elements.all { contains(it) } // use when js will support bound refs: elements.all(this::contains)\n\n   override fun isEmpty(): Boolean = size == 0\n\n   override fun toString(): String = joinToString(\", \", \"[\", \"]\") {\n   if (it === this) \"(this Collection)\" else it.toString()\n   }\n\n   /**\n   * Returns new array of type `Array<Any?>` with the elements of this collection.\n   */\n   protected open fun toArray(): Array<Any?> = copyToArrayImpl(this)\n\n   /**\n   * Fills the provided [array] or creates new array of the same type\n   * and fills it with the elements of this collection.\n   */\n   protected open fun <T> toArray(array: Array<T>): Array<T> = copyToArrayImpl(this, array)\n}\n","package kotlin.collections\n\n\nprivate enum class State {\n   Ready,\n   NotReady,\n   Done,\n   Failed\n}\n\n/**\n * A base class to simplify implementing iterators so that implementations only have to implement [computeNext]\n * to implement the iterator, calling [done] when the iteration is complete.\n */\npublic abstract class AbstractIterator<T>: Iterator<T> {\n   private var state = State.NotReady\n   private var nextValue: T? = null\n\n   override fun hasNext(): Boolean {\n   require(state != State.Failed)\n   return when (state) {\n   State.Done -> false\n   State.Ready -> true\n   else -> tryToComputeNext()\n   }\n   }\n\n   override fun next(): T {\n   if (!hasNext()) throw NoSuchElementException()\n   state = State.NotReady\n   @Suppress(\"UNCHECKED_CAST\")\n   return nextValue as T\n   }\n\n   private fun tryToComputeNext(): Boolean {\n   state = State.Failed\n   computeNext()\n   return state == State.Ready\n   }\n\n   /**\n   * Computes the next item in the iterator.\n   *\n   * This callback method should call one of these two methods:\n   *\n   * * [setNext] with the next value of the iteration\n   * * [done] to indicate there are no more elements\n   *\n   * Failure to call either method will result in the iteration terminating with a failed state\n   */\n   abstract protected fun computeNext(): Unit\n\n   /**\n   * Sets the next value in the iteration, called from the [computeNext] function\n   */\n   protected fun setNext(value: T): Unit {\n   nextValue = value\n   state = State.Ready\n   }\n\n   /**\n   * Sets the state to done so that the iteration terminates.\n   */\n   protected fun done() {\n   state = State.Done\n   }\n}\n\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed

on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT AbstractList\n * Copyright 2007 Google Inc.\n*/\n\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the read-only [List] interface.\n *\n * This class is intended to help implementing read-only lists so it doesn't support concurrent modification tracking.\n *\n * @param E the type of elements contained in the list. The list is covariant on its element type.\n */\n@SinceKotlin(\"1.1\")\npublic abstract class AbstractList<out E> protected constructor() : AbstractCollection<E>(), List<E> {\n   abstract override val size: Int\n   abstract override fun get(index: Int): E\n\n   override fun iterator(): Iterator<E> = IteratorImpl()\n\n   override fun indexOf(element: @UnsafeVariance E): Int = indexOfFirst { it == element }\n\n   override fun lastIndexOf(element: @UnsafeVariance E): Int = indexOfLast { it == element }\n\n   override fun listIterator(): ListIterator<E> = ListIteratorImpl(0)\n\n   override fun listIterator(index: Int): ListIterator<E> = ListIteratorImpl(index)\n\n   override fun subList(fromIndex: Int, toIndex: Int): List<E> = SubList(this, fromIndex, toIndex)\n\n   private class SubList<out E>(private val list: AbstractList<E>, private val fromIndex: Int, toIndex: Int) : AbstractList<E>(), RandomAccess {\n   private var _size: Int = 0\n\n   init {\n   checkRangeIndexes(fromIndex, toIndex, list.size)\n   this._size = toIndex - fromIndex\n   }\n\n   override fun get(index: Int): E {\n   checkElementIndex(index, _size)\n\n   return list[fromIndex + index]\n   }\n\n   override val size: Int get() = _size\n   }\n\n   /**\n   * Compares this list with other list instance with the ordered structural equality.\n   *\n   * @return true, if [other] instance is a [List] of the same size, which contains the same elements in the same order.\n   */\n   override fun equals(other: Any?): Boolean {\n   if (other === this) return true\n   if (other !is List<*>) return false\n\n   return orderedEquals(this, other)\n   }\n\n   /**\n   * Returns the hash code value for this list.\n   */\n   override fun hashCode(): Int = orderedHashCode(this)\n\n   private open inner class IteratorImpl : Iterator<E> {\n   /** the index of the item that will be returned on the next call to [next]`()` */\n   protected var index = 0\n\n   override fun hasNext(): Boolean = index < size\n\n   override fun next(): E {\n   if (!hasNext()) throw NoSuchElementException()\n   return get(index++)\n   }\n   }\n\n   /**\n   * Implementation of [ListIterator] for abstract lists.\n   */\n   private open inner class ListIteratorImpl(index: Int) : IteratorImpl(), ListIterator<E> {\n\n   init {\n   checkPositionIndex(index, this@AbstractList.size)\n   this.index = index\n   }\n\n   override fun hasPrevious(): Boolean = index > 0\n\n   override fun nextIndex(): Int = index\n\n   override fun previous(): E {\n   if (!hasPrevious()) throw NoSuchElementException()\n   return get(--index)\n   }\n\n   override fun previousIndex(): Int = index - 1\n   }\n\n   internal companion object {\n   internal fun checkElementIndex(index: Int, size: Int) {\n   if (index < 0 || index >= size) {\n   throw IndexOutOfBoundsException(\"index: $index, size: $size\")\n   }\n   }\n\n   internal fun checkPositionIndex(index: Int, size: Int) {\n   if (index < 0 || index > size) {\n   throw IndexOutOfBoundsException(\"index: $index, size: $size\")\n   }\n   }\n\n   internal fun checkRangeIndexes(fromIndex: Int, toIndex: Int, size: Int) {\n   if (fromIndex < 0 || toIndex > size) {\n   throw IndexOutOfBoundsException(\"fromIndex: $fromIndex, toIndex: $toIndex, size: $size\")\n   }\n   if (fromIndex > toIndex) {\n   throw IllegalArgumentException(\"fromIndex: $fromIndex > toIndex: $toIndex\")\n   }\n   }\n\n   internal fun orderedHashCode(c: Collection<*>): Int {\n   var hashCode = 1\n   for (e in c) {\n   hashCode = 31 * hashCode + (e?.hashCode() ?: 0)\n   }\n   return hashCode\n   }\n\n   internal fun orderedEquals(c: Collection<*>, other: Collection<*>): Boolean {\n   if (c.size != other.size) return false\n\n   val otherIterator = other.iterator()\n   for (elem in c) {\n   val elemOther = otherIterator.next()\n   if (elem != elemOther) {\n   return false\n   }\n   }\n   return true\n   }\n   }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the

License.\n */\n/*\n * Based on GWT AbstractMap\n * Copyright 2007 Google Inc.\n */\n\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the read-only [Map] interface.\n *\n * The implementor is required to implement [entries] property, which should return read-only set of map entries.\n *\n * @param K the type of map keys. The map is invariant on its key type.\n * @param V the type of map values. The map is covariant on its value type.\n*/\n@SinceKotlin(\"1.1\")\npublic abstract class AbstractMap<K, out V> protected constructor() : Map<K, V> {\n\n   override fun containsKey(key: K): Boolean {\n   return implFindEntry(key) != null\n   }\n\n   override fun containsValue(value: @UnsafeVariance V): Boolean = entries.any { it.value == value }\n\n   internal fun containsEntry(entry: Map.Entry<*, *>?): Boolean {\n   // since entry comes from @UnsafeVariance parameters it can be virtually anything\n   if (entry !is Map.Entry<*, *>) return false\n   val key = entry.key\n   val value = entry.value\n   val ourValue = get(key)\n\n   if (value != ourValue) {\n   return false\n   }\n\n   // Perhaps it was null and we don't contain the key?\n   if (ourValue == null && !containsKey(key)) {\n   return false\n   }\n\n   return true\n   }\n\n   /**\n   * Compares this map with other instance with the ordered structural equality.\n   *\n   * @return true, if [other] instance is a [Map] of the same size, all entries of which are contained in the [entries] set of this map.\n   */\n   override fun equals(other: Any?): Boolean {\n   if (other === this) return true\n   if (other !is Map<*, *>) return false\n   if (size != other.size) return false\n\n   return other.entries.all { containsEntry(it) }\n   }\n\n   override operator fun get(key: K): V? = implFindEntry(key)?.value\n\n   /**\n   * Returns the hash code value for this map.\n   *\n   * It is the same as the hashCode of [entries] set.\n   */\n   override fun hashCode(): Int = entries.hashCode()\n\n   override fun isEmpty(): Boolean = size == 0\n   override val size: Int get() = entries.size\n\n   /**\n   * Returns a read-only [Set] of all keys in this map.\n   *\n   * Accessing this property first time creates a keys view from [entries].\n   * All subsequent accesses just return the created instance.\n   */\n   private @kotlin.jvm.Volatile var _keys: Set<K>? = null\n   override val keys: Set<K> get() {\n   if (_keys == null) {\n   _keys = object : AbstractSet<K>() {\n   override operator fun contains(element: K): Boolean = containsKey(element)\n\n   override operator fun iterator(): Iterator<K> {\n   val entryIterator = entries.iterator()\n   return object : Iterator<K> {\n   override fun hasNext(): Boolean = entryIterator.hasNext()\n   override fun next(): K = entryIterator.next().key\n   }\n   }\n\n   override val size: Int get() = this@AbstractMap.size\n   }\n   }\n   return _keys!!\n   }\n\n   override fun toString(): String = entries.joinToString(\", \", \"{\", \"}\") { toString(it) }\n\n   private fun toString(entry: Map.Entry<K, V>): String = toString(entry.key) + \"=\" + toString(entry.value)\n\n   private fun toString(o: Any?): String = if (o === this) \"(this Map)\" else o.toString()\n\n   /**\n   * Returns a read-only [Collection] of all values in this map.\n   *\n   * Accessing this property first time creates a values view from [entries].\n   * All subsequent accesses just return the created instance.\n   */\n   private @kotlin.jvm.Volatile var _values: Collection<V>? = null\n   override val values: Collection<V> get() {\n   if (_values == null) {\n   _values = object : AbstractCollection<V>() {\n   override operator fun contains(element: @UnsafeVariance V): Boolean = containsValue(element)\n\n   override operator fun iterator(): Iterator<V> {\n   val entryIterator = entries.iterator()\n   return object : Iterator<V> {\n   override fun hasNext(): Boolean = entryIterator.hasNext()\n   override fun next(): V = entryIterator.next().value\n   }\n   }\n\n   override val size: Int get() = this@AbstractMap.size\n   }\n   }\n   return _values!!\n   }\n\n   private fun implFindEntry(key: K): Map.Entry<K, V>? = entries.firstOrNull { it.key == key }\n\n   internal companion object {\n\n   internal fun entryHashCode(e: Map.Entry<*, *>): Int = with(e) { (key?.hashCode() ?: 0) xor (value?.hashCode() ?: 0) }\n   internal fun entryToString(e: Map.Entry<*, *>): String = with(e) { \"$key=$value\" }\n   internal fun entryEquals(e: Map.Entry<*, *>, other: Any?): Boolean {\n   if (other !is Map.Entry<*, *>) return false\n   return e.key == other.key && e.value == other.value\n   }\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for

the specific language governing permissions and\n * limitations under the License.\n *\/\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the read-only [Set] interface.\n *\n * This class is intended to help implementing read-only sets so it doesn't support concurrent modification tracking.\n *\n * @param E the type of elements contained in the set. The set is covariant on its element type.\n *\/\n@SinceKotlin(\"1.1\")\npublic abstract class AbstractSet<out E> protected constructor() : AbstractCollection<E>(), Set<E> {\n\n   /**\n   * Compares this set with other set instance with the unordered structural equality.\n   *\n   * @return true, if [other] instance is a [Set] of the same size, all elements of which are contained in this set.\n   *\/   override fun equals(other: Any?): Boolean {\n   if (other === this) return true\n   if (other !is Set<*>) return false\n   return setEquals(this, other)\n   }\n\n   /**\n   * Returns the hash code value for this set.\n   *\/   override fun hashCode(): Int = unorderedHashCode(this)\n\n   internal companion object {\n   internal fun unorderedHashCode(c: Collection<*>): Int {\n   var hashCode = 0\n   for (element in c) {\n   hashCode += (element?.hashCode() ?: 0)\n   }\n   return hashCode\n   }\n\n   internal fun setEquals(c: Set<*>, other: Set<*>): Boolean {\n   if (c.size != other.size) return false\n   return c.containsAll(other)\n   }\n   }\n\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"ArraysKt\")\n\n\npackage kotlin.collections\n\n\n/**\n * Returns a single list of all elements from all arrays in the given array.\n * @sample samples.collections.Arrays.Transformations.flattenArray\n *\/\npublic fun <T> Array<out Array<out T>>.flatten(): List<T> {\n   val result = ArrayList<T>(sumBy { it.size })\n   for (element in this) {\n   result.addAll(element)\n   }\n   return result\n}\n\n/**\n * Returns a pair of lists, where\n * *first* list is built from the first values of each pair from this array,\n * *second* list is built from the second values of each pair from this array.\n * @sample samples.collections.Arrays.Transformations.unzipArray\n *\/\npublic fun <T, R> Array<out Pair<T, R>>.unzip(): Pair<List<T>, List<R>> {\n   val listT = ArrayList<T>(size)\n   val listR = ArrayList<R>(size)\n   for (pair in this) {\n   listT.add(pair.first)\n   listR.add(pair.second)\n   }\n   return listT to listR\n}\n","package kotlin.collections\n\n/**\n * Represents a source of elements with a [keyOf] function, which can be applied to each element to get its key.\n *\n * A [Grouping] structure serves as an intermediate step in group-and-fold operations:\n * they group elements by their keys and then fold each group with some aggregating operation.\n *\n * It is created by attaching `keySelector: (T) -> K` function to a source of elements.\n * To get an instance of [Grouping] use one of `groupingBy` extension functions:\n * - [Iterable.groupingBy]\n * - [Sequence.groupingBy]\n * - [Array.groupingBy]\n * - [CharSequence.groupingBy]\n *\n * For the list of group-and-fold operations available, see the [extension functions](#extension-functions) for `Grouping`.\n *\/\n@SinceKotlin(\"1.1\")\npublic interface Grouping<T, out K> {\n   /** Returns an [Iterator] over the elements of the source of this grouping. *\/   fun sourceIterator(): Iterator<T>\n   /** Extracts the key of an [element]. *\/   fun keyOf(element: T): K}\n\n/**\n * Groups elements from the [Grouping] source by key and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments, and stores the results in a new map.\n *\n * The key for each element is provided by the [Grouping.keyOf] function.\n *\n * @param operation function is invoked on each element with the following parameters:\n * - `key`: the key of the group this element belongs to;\n * - `accumulator`: the current value of the accumulator of the group, can be `null` if it's the first `element` encountered in the group;\n * - `element`: the element from the source being aggregated;\n * - `first`: indicates whether it's the first `element` encountered in the group.\n *\n * @return a [Map] associating the key of each group with the result of aggregation of the group elements.\n *\/\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R> Grouping<T, K>.aggregate(\n   operation: (key: K, accumulator: R?, element: T, first: Boolean) -> R\n): Map<K, R> {\n   return aggregateTo(mutableMapOf<K, R>(), operation)\n}\n\n/**\n * Groups elements from the [Grouping] source by key

and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments,\n * and stores the results in the given [destination] map.\n *\n * The key for each element is provided by the [Grouping.keyOf] function.\n *\n * @param operation a function that is invoked on each element with the following parameters:\n * - `key`: the key of the group this element belongs to;\n * - `accumulator`: the current value of the accumulator of the group, can be `null` if it's the first `element` encountered in the group;\n * - `element`: the element from the source being aggregated;\n * - `first`: indicates whether it's the first `element` encountered in the group.\n *\n * If the [destination] map already has a value corresponding to some key,\n * then the elements being aggregated for that key are never considered as `first`.\n *\n * @return the [destination] map associating the key of each group with the result of aggregation of the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R, M : MutableMap<in K, R>> Grouping<T, K>.aggregateTo(\n   destination: M,\n   operation: (key: K, accumulator: R?, element: T, first: Boolean) -> R\n): M {\n   for (e in this.sourceIterator()) {\n   val key = keyOf(e)\n   val accumulator = destination[key]\n   destination[key] = operation(key, accumulator, e, accumulator == null && !destination.containsKey(key))\n   }\n   return destination\n}\n\n/**\n * Groups elements from the [Grouping] source by key and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments, and stores the results in a new map.\n * An initial value of accumulator is provided by [initialValueSelector] function.\n *\n * @param initialValueSelector a function that provides an initial value of accumulator for each group.\n * It's invoked with parameters:\n * - `key`: the key of the group;\n * - `element`: the first element being encountered in that group.\n *\n * @param operation a function that is invoked on each element with the following parameters:\n * - `key`: the key of the group this element belongs to;\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being accumulated.\n *\n * @return a [Map] associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R> Grouping<T, K>.fold(\n   initialValueSelector: (key: K, element: T) -> R,\n   operation: (key: K, accumulator: R, element: T) -> R): Map<K, R> =\n   @Suppress(\"UNCHECKED_CAST\")\n   aggregate { key, acc, e, first -> operation(key, if (first) initialValueSelector(key, e) else acc as R, e) }\n\n/**\n * Groups elements from the [Grouping] source by key and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments,\n * and stores the results in the given [destination] map.\n * An initial value of accumulator is provided by [initialValueSelector] function.\n *\n * @param initialValueSelector a function that provides an initial value of accumulator for each group.\n * It's invoked with parameters:\n * - `key`: the key of the group;\n * - `element`: the first element being encountered in that group.\n *\n * If the [destination] map already has a value corresponding to some key, that value is used as an initial value of\n * the accumulator for that group and the [initialValueSelector] function is not called for that group.\n *\n * @param operation a function that is invoked on each element with the following parameters:\n * - `key`: the key of the group this element belongs to;\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being accumulated.\n *\n * @return the [destination] map associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R, M : MutableMap<in K, R>> Grouping<T, K>.foldTo(\n   destination: M,\n   initialValueSelector: (key: K, element: T) -> R,\n   operation: (key: K, accumulator: R, element: T) -> R): M =\n   @Suppress(\"UNCHECKED_CAST\")\n   aggregateTo(destination) { key, acc, e, first -> operation(key, if (first) initialValueSelector(key, e) else acc as R, e) }\n\n\n/**\n * Groups elements from the [Grouping] source by key and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments, and stores the results in a new map.\n * An initial value of accumulator is the same [initialValue] for each group.\n *\n * @param operation a function that is invoked on each element with the following parameters:\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being accumulated.\n *\n * @return a [Map] associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R> Grouping<T, K>.fold(\n   initialValue: R,\n   operation: (accumulator: R, element: T) -> R): Map<K, R> =\n   @Suppress(\"UNCHECKED_CAST\")\n

aggregate { _, acc, e, first -> operation(if (first) initialValue else acc as R, e) }\n\n/**\n * Groups elements from the [Grouping] source by key and applies [operation] to the elements of each group sequentially,\n * passing the previously accumulated value and the current element as arguments,\n * and stores the results in the given [destination] map.\n * An initial value of accumulator is the same [initialValue] for each group.\n *\n * If the [destination] map already has a value corresponding to the key of some group,\n * that value is used as an initial value of the accumulator for that group.\n *\n * @param operation a function that is invoked on each element with the following parameters:\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being accumulated.\n *\n * @return the [destination] map associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K, R, M : MutableMap<in K, R>> Grouping<T, K>.foldTo(\n   destination: M,\n   initialValue: R,\n   operation: (accumulator: R, element: T) -> R\n): M =\n   @Suppress(\"UNCHECKED_CAST\")\n aggregateTo(destination) { _, acc, e, first -> operation(if (first) initialValue else acc as R, e) }\n\n\n/**\n * Groups elements from the [Grouping] source by key and applies the reducing [operation] to the elements of each group\n * sequentially starting from the second element of the group,\n * passing the previously accumulated value and the current element as arguments,\n * and stores the results in a new map.\n * An initial value of accumulator is the first element of the group.\n *\n * @param operation a function that is invoked on each subsequent element of the group with the following parameters:\n * - `key`: the key of the group this element belongs to;\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being accumulated.\n *\n * @return a [Map] associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <S, T : S, K> Grouping<T, K>.reduce(\n   operation: (key: K, accumulator: S, element: T) -> S\n): Map<K, S> =\n   aggregate { key, acc, e, first ->\n   @Suppress(\"UNCHECKED_CAST\")\n   if (first) e else operation(key, acc as S, e)\n   }\n\n/**\n * Groups elements from the [Grouping] source by key and applies the reducing [operation] to the elements of each group\n * sequentially starting from the second element of the group,\n * passing the previously accumulated value and the current element as arguments,\n * and stores the results in the given [destination] map.\n * An initial value of accumulator is the first element of the group.\n *\n * If the [destination] map already has a value corresponding to the key of some group,\n * that value is used as an initial value of the accumulator for that group and the first element of that group is also\n * subjected to the [operation].\n\n * @param operation a function that is invoked on each subsequent element of the group with the following parameters:\n * - `accumulator`: the current value of the accumulator of the group;\n * - `element`: the element from the source being folded;\n *\n * @return the [destination] map associating the key of each group with the result of accumulating the group elements.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <S, T : S, K, M : MutableMap<in K, S>> Grouping<T, K>.reduceTo(\n   destination: M,\n   operation: (key: K, accumulator: S, element: T) -> S): M =\n aggregateTo(destination) { key, acc, e, first ->\n   @Suppress(\"UNCHECKED_CAST\")\n   if (first) e else operation(key, acc as S, e)\n   }\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n/**\n * Groups elements from the [Grouping] source by key and counts elements in each group to the given [destination] map.\n *\n * If the [destination] map already has a value corresponding to the key of some group,\n * that value is used as an initial value of the counter for that group.\n *\n * @return the [destination] map associating the key of each group with the count of elements in the group.\n *\n * @sample samples.collections.Collections.Transformations.groupingByEachCount\n */\n@SinceKotlin(\"1.1\")\npublic fun <T, K, M : MutableMap<in K, Int>> Grouping<T, K>.eachCountTo(destination: M): M =\n   foldTo(destination, 0) { acc, _ -> acc + 1 }\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n/*\n// TODO: sum by long and by double overloads\n\npublic inline fun <T, K, M : MutableMap<in K, Long>> Grouping<T, K>.sumEachByLongTo(destination: M, valueSelector: (T) -> Long): M =\n   foldTo(destination, 0L) { acc, e -> acc + valueSelector(e)}\n\npublic inline fun <T, K> Grouping<T, K>.sumEachByLong(valueSelector: (T) -> Long): Map<K, Long> =\n   fold(0L) { acc, e -> acc + valueSelector(e)}\n\npublic inline fun <T, K, M : MutableMap<in K, Double>> Grouping<T, K>.sumEachByDoubleTo(destination: M, valueSelector: (T) ->

Double): M =\n   foldTo(destination, 0.0) { acc, e -> acc + valueSelector(e)}\n\npublic inline fun <T, K> Grouping<T, K>.sumEachByDouble(valueSelector: (T) -> Double): Map<K, Double> =\n   fold(0.0) { acc, e -> acc + valueSelector(e)}\n*/\n","package kotlin.collections\n\n/**\n * Data class representing a value from a collection or sequence, along with its index in that collection or sequence.\n *\n * @property value the underlying value.\n * @property index the index of the value in the collection or sequence.\n */\npublic data class IndexedValue<out T>(public val index: Int, public val value: T)\n","@file:kotlin.jvm.JvmName(\"MapAccessorsKt\")\npackage kotlin.collections\n\nimport kotlin.reflect.KProperty\nimport kotlin.internal.Exact\n\n/**\n * Returns the value of the property for the given object from this read-only map.\n * @param thisRef the object for which the value is requested (not used).\n * @param property the metadata for the property, used to get the name of property and lookup the value corresponding to this name in the map.\n * @return the property value.\n *\n * @throws NoSuchElementException when the map doesn't contain value for the property name and doesn't provide an implicit default (see [withDefault]).\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <V, V1: V> Map<in String, @Exact V>.getValue(thisRef: Any?, property: KProperty<*>): V1\n   = @Suppress(\"UNCHECKED_CAST\") (getOrImplicitDefault(property.name) as V1)\n\n/**\n * Returns the value of the property for the given object from this mutable map.\n * @param thisRef the object for which the value is requested (not used).\n * @param property the metadata for the property, used to get the name of property and lookup the value corresponding to this name in the map.\n * @return the property value.\n *\n * @throws NoSuchElementException when the map doesn't contain value for the property name and doesn't provide an implicit default (see [withDefault]).\n */\n@kotlin.jvm.JvmName(\"getVar\")\n@kotlin.internal.InlineOnly\npublic inline operator fun <V, V1: V> MutableMap<in String, out @Exact V>.getValue(thisRef: Any?, property: KProperty<*>): V1\n   = @Suppress(\"UNCHECKED_CAST\") (getOrImplicitDefault(property.name) as V1)\n\n@Deprecated(\"Use getValue() with two type parameters instead\")\n@kotlin.jvm.JvmName(\"getVarContravariant\")\n@kotlin.internal.LowPriorityInOverloadResolution\n@kotlin.internal.InlineOnly\npublic inline fun <V> MutableMap<in String, in V>.getValue(thisRef: Any?, property: KProperty<*>): V\n   = @Suppress(\"UNCHECKED_CAST\") (getOrImplicitDefault(property.name) as V)\n\n/**\n * Stores the value of the property for the given object in this mutable map.\n * @param thisRef the object for which the value is requested (not used).\n * @param property the metadata for the property, used to get the name of property and store the value associated with that name in the map.\n * @param value the value to set.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <V> MutableMap<in String, in V>.setValue(thisRef: Any?, property: KProperty<*>, value: V) {\n   this.put(property.name, value)\n}\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"MapsKt\")\n\npackage kotlin.collections\n\n/**\n * Returns the value for the given key, or the implicit default value for this map.\n * By default no implicit value is provided for maps and a [NoSuchElementException] is thrown.\n * To create a map with implicit default value use [withDefault] method.\n *\n * @throws NoSuchElementException when the map doesn't contain a value for the specified key and no implicit default was provided for that map.\n */\n@kotlin.jvm.JvmName(\"getOrImplicitDefaultNullable\")\n@PublishedApi\ninternal fun <K, V> Map<K, V>.getOrImplicitDefault(key: K): V {\n   if (this is MapWithDefault)\n   return this.getOrImplicitDefault(key)\n\n   return getOrElseNullable(key, { throw NoSuchElementException(\"Key $key is missing in the map.\") })\n}\n\n/**\n * Returns a wrapper of this read-only map, having the implicit default value provided with the specified function [defaultValue].\n *\n * This implicit default value is used when the original map doesn't contain a value for the key specified\n * and a value is obtained with [Map.getValue] function, for example when properties are delegated to the map.\n *\n * When this map already has an implicit default value provided with a former call to [withDefault], it is being replaced by this call.\n */\npublic fun <K, V> Map<K, V>.withDefault(defaultValue: (key: K) -> V): Map<K, V> =\n   when (this) {\n   is MapWithDefault -> this.map.withDefault(defaultValue)\n   else -> MapWithDefaultImpl(this, defaultValue)\n   }\n\n/**\n * Returns a wrapper of this mutable map, having the implicit default value provided with the specified function [defaultValue].\n *\n * This implicit default value is used when the original map doesn't contain a value for the key

specified\n * and a value is obtained with [Map.getValue] function, for example when properties are delegated to the map.\n *\n * When this map already has an implicit default value provided with a former call to [withDefault], it is being replaced by this call.\n */\n@kotlin.jvm.JvmName(\"withDefaultMutable\")\npublic fun <K, V> MutableMap<K, V>.withDefault(defaultValue: (key: K) -> V): MutableMap<K, V> =\n   when (this) {\n   is MutableMapWithDefault -> this.map.withDefault(defaultValue)\n   else -> MutableMapWithDefaultImpl(this, defaultValue)\n   }\n\n\n\n\nprivate interface MapWithDefault<K, out V>: Map<K, V> {\n   public val map: Map<K, V>\n   public fun getOrImplicitDefault(key: K): V\n}\n\nprivate interface MutableMapWithDefault<K, V>: MutableMap<K, V>, MapWithDefault<K, V> {\n   public override val map: MutableMap<K, V>\n}\n\n\nprivate class MapWithDefaultImpl<K, out V>(public override val map: Map<K,V>, private val default: (key: K) -> V) : MapWithDefault<K, V> {\n   override fun equals(other: Any?): Boolean = map.equals(other)\n   override fun hashCode(): Int = map.hashCode()\n   override fun toString(): String = map.toString()\n   override val size: Int get() = map.size\n   override fun isEmpty(): Boolean = map.isEmpty()\n   override fun containsKey(key: K): Boolean = map.containsKey(key)\n   override fun containsValue(value: @UnsafeVariance V): Boolean = map.containsValue(value)\n   override fun get(key: K): V? = map.get(key)\n   override val keys: Set<K> get() = map.keys\n   override val values: Collection<V> get() = map.values\n   override val entries: Set<Map.Entry<K, V>> get() = map.entries\n\n   override fun getOrImplicitDefault(key: K): V = map.getOrElseNullable(key, { default(key) })\n}\n\nprivate class MutableMapWithDefaultImpl<K, V>(public override val map: MutableMap<K, V>, private val default: (key: K) -> V): MutableMapWithDefault<K, V> {\n   override fun equals(other: Any?): Boolean = map.equals(other)\n   override fun hashCode(): Int = map.hashCode()\n   override fun toString(): String = map.toString()\n   override val size: Int get() = map.size\n   override fun isEmpty(): Boolean = map.isEmpty()\n   override fun containsKey(key: K): Boolean = map.containsKey(key)\n   override fun containsValue(value: @UnsafeVariance V): Boolean = map.containsValue(value)\n   override fun get(key: K): V? = map.get(key)\n   override val keys: MutableSet<K> get() = map.keys\n   override val values: MutableCollection<V> get() = map.values\n   override val entries: MutableSet<MutableMap.MutableEntry<K, V>> get() = map.entries\n\n   override fun put(key: K, value: V): V? = map.put(key, value)\n   override fun remove(key: K): V? = map.remove(key)\n   override fun putAll(from: Map<out K, V>) = map.putAll(from)\n   override fun clear() = map.clear()\n\n   override fun getOrImplicitDefault(key: K): V = map.getOrElseNullable(key, { default(key) })\n}\n\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\n\npackage kotlin.collections\n\n/**\n * Removes a single instance of the specified element from this\n * collection, if it is present.\n *\n * Allows to overcome type-safety restriction of `remove` that requires to pass an element of type `E`.\n *\n * @return `true` if the element has been successfully removed; `false` if it was not present in the collection.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes T> MutableCollection<out T>.remove(element: T): Boolean\n   = @Suppress(\"UNCHECKED_CAST\") (this as MutableCollection<T>).remove(element)\n\n/**\n * Removes all of this collection's elements that are also contained in the specified collection.\n\n * Allows to overcome type-safety restriction of `removeAll` that requires to pass a collection of type `Collection<E>`.\n *\n * @return `true` if any of the specified elements was removed from the collection, `false` if the collection was not modified.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes T> MutableCollection<out T>.removeAll(elements: Collection<T>): Boolean\n   = @Suppress(\"UNCHECKED_CAST\") (this as MutableCollection<T>).removeAll(elements)\n\n/**\n * Retains only the elements in this collection that are contained in the specified collection.\n *\n * Allows to overcome type-safety restriction of `retainAll` that requires to pass a collection of type `Collection<E>`.\n *\n * @return `true` if any element was removed from the collection, `false` if the collection was not modified.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <@kotlin.internal.OnlyInputTypes T> MutableCollection<out T>.retainAll(elements: Collection<T>): Boolean\n   = @Suppress(\"UNCHECKED_CAST\") (this as MutableCollection<T>).retainAll(elements)\n\n/**\n * Removes the element at the specified [index] from this list.\n * In Kotlin one should use the [MutableList.removeAt] function instead.\n */\n@Deprecated(\"Use removeAt(index) instead.\", ReplaceWith(\"removeAt(index)\"), level =

DeprecationLevel.ERROR)\n@kotlin.internal.InlineOnly\npublic inline fun <T> MutableList<T>.remove(index: Int): T = removeAt(index)\n\n/* Not available on platform: JS */\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n/**\n * Adds the specified [element] to this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.plusAssign(element: T) {\n   this.add(element)\n}\n\n/**\n * Adds all elements of the given [elements] collection to this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.plusAssign(elements: Iterable<T>) {\n   this.addAll(elements)\n}\n\n/**\n * Adds all elements of the given [elements] array to this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.plusAssign(elements: Array<T>) {\n   this.addAll(elements)\n}\n\n/**\n * Adds all elements of the given [elements] sequence to this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.plusAssign(elements: Sequence<T>) {\n   this.addAll(elements)\n}\n\n/**\n * Removes a single instance of the specified [element] from this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.minusAssign(element: T) {\n   this.remove(element)\n}\n\n/**\n * Removes all elements contained in the given [elements] collection from this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.minusAssign(elements: Iterable<T>) {\n   this.removeAll(elements)\n}\n\n/**\n * Removes all elements contained in the given [elements] array from this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.minusAssign(elements: Array<T>) {\n   this.removeAll(elements)\n}\n\n/**\n * Removes all elements contained in the given [elements] sequence from this mutable collection.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> MutableCollection<in T>.minusAssign(elements: Sequence<T>) {\n   this.removeAll(elements)\n}\n\n/**\n * Adds all elements of the given [elements] collection to this [MutableCollection].\n */\npublic fun <T> MutableCollection<in T>.addAll(elements: Iterable<T>): Boolean {\n   when (elements) {\n   is Collection -> return addAll(elements)\n   else -> {\n   var result: Boolean = false\n   for (item in elements)\n   if (add(item)) result = true\n   return result\n   }\n   }\n}\n\n/**\n * Adds all elements of the given [elements] sequence to this [MutableCollection].\n */\npublic fun <T> MutableCollection<in T>.addAll(elements: Sequence<T>): Boolean {\n   var result: Boolean = false\n   for (item in elements) {\n   if (add(item)) result = true\n   }\n   return result\n}\n\n/**\n * Adds all elements of the given [elements] array to this [MutableCollection].\n */\npublic fun <T> MutableCollection<in T>.addAll(elements: Array<out T>): Boolean {\n   return addAll(elements.asList())\n}\n\n/**\n * Removes all elements from this [MutableIterable] that match the given [predicate].\n */\npublic fun <T> MutableIterable<T>.removeAll(predicate: (T) -> Boolean): Boolean = filterInPlace(predicate, true)\n\n/**\n * Retains only elements of this [MutableIterable] that match the given [predicate].\n */\npublic fun <T> MutableIterable<T>.retainAll(predicate: (T) -> Boolean): Boolean = filterInPlace(predicate, false)\n\nprivate fun <T> MutableIterable<T>.filterInPlace(predicate: (T) -> Boolean, predicateResultToRemove: Boolean): Boolean {\n   var result = false\n   with (iterator()) {\n   while (hasNext())\n   if (predicate(next()) == predicateResultToRemove) {\n   remove()\n   result = true\n   }\n   }\n   return result\n}\n\n/**\n * Removes all elements from this [MutableList] that match the given [predicate].\n */\npublic fun <T> MutableList<T>.removeAll(predicate: (T) -> Boolean): Boolean = filterInPlace(predicate, true)\n\n/**\n * Retains only elements of this [MutableList] that match the given [predicate].\n */\npublic fun <T> MutableList<T>.retainAll(predicate: (T) -> Boolean): Boolean = filterInPlace(predicate, false)\n\nprivate fun <T> MutableList<T>.filterInPlace(predicate: (T) -> Boolean, predicateResultToRemove: Boolean): Boolean {\n   if (this !is RandomAccess)\n   return (this as MutableIterable<T>).filterInPlace(predicate, predicateResultToRemove)\n\n   var writeIndex: Int = 0\n   for (readIndex in 0..lastIndex) {\n   val element = this[readIndex]\n   if (predicate(element) == predicateResultToRemove)\n   continue\n\n   if (writeIndex != readIndex)\n   this[writeIndex] = element\n\n   writeIndex++\n   }\n   if (writeIndex < size) {\n   for (removeIndex in lastIndex downTo writeIndex)\n   removeAt(removeIndex)\n\n   return true\n   } else {\n   return false\n   }\n}\n\n/**\n * Removes all elements from this [MutableCollection] that are also contained in the given [elements]

collection.\n */\npublic fun <T> MutableCollection<in T>.removeAll(elements: Iterable<T>): Boolean {\n   return removeAll(elements.convertToSetForSetOperationWith(this))\n}\n\n/**\n * Removes all elements from this [MutableCollection] that are also contained in the given [elements] sequence.\n */\npublic fun <T> MutableCollection<in T>.removeAll(elements: Sequence<T>): Boolean {\n   val set = elements.toHashSet()\n   return set.isNotEmpty() && removeAll(set)\n}\n\n/**\n * Removes all elements from this [MutableCollection] that are also contained in the given [elements] array.\n */\npublic fun <T> MutableCollection<in T>.removeAll(elements: Array<out T>): Boolean {\n   return elements.isNotEmpty() && removeAll(elements.toHashSet())\n}\n\n/**\n * Retains only elements of this [MutableCollection] that are contained in the given [elements] collection.\n */\npublic fun <T> MutableCollection<in T>.retainAll(elements: Iterable<T>): Boolean {\n   return retainAll(elements.convertToSetForSetOperationWith(this))\n}\n\n/**\n * Retains only elements of this [MutableCollection] that are contained in the given [elements] array.\n */\npublic fun <T> MutableCollection<in T>.retainAll(elements: Array<out T>): Boolean {\n   if (elements.isNotEmpty())\n   return retainAll(elements.toHashSet())\n   else\n   return retainNothing()\n}\n\n/**\n * Retains only elements of this [MutableCollection] that are contained in the given [elements] sequence.\n */\npublic fun <T> MutableCollection<in T>.retainAll(elements: Sequence<T>): Boolean {\n   val set = elements.toHashSet()\n   if (set.isNotEmpty())\n   return retainAll(set)\n   else\n   return retainNothing()\n}\n\nprivate fun MutableCollection<*>.retainNothing(): Boolean {\n   val result = isNotEmpty()\n   clear()\n   return result\n}\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CollectionsKt\")\n\npackage kotlin.collections\n\n\nprivate open class ReversedListReadOnly<out T>(private val delegate: List<T>) : AbstractList<T>() {\n   override val size: Int get() = delegate.size\n   override fun get(index: Int): T = delegate[reverseElementIndex(index)]\n}\n\nprivate class ReversedList<T>(private val delegate: MutableList<T>) : AbstractMutableList<T>() {\n   override val size: Int get() = delegate.size\n   override fun get(index: Int): T = delegate[reverseElementIndex(index)]\n\n   override fun clear() = delegate.clear()\n   override fun removeAt(index: Int): T = delegate.removeAt(reverseElementIndex(index))\n\n   override fun set(index: Int, element: T): T = delegate.set(reverseElementIndex(index), element)\n   override fun add(index: Int, element: T) {\n   delegate.add(reversePositionIndex(index), element)\n   }\n}\nprivate fun List<*>.reverseElementIndex(index: Int) =\n   if (index in 0..lastIndex) lastIndex - index else throw IndexOutOfBoundsException(\"Element index \$index must be in range [\${0..lastIndex}].\")\n\nprivate fun List<*>.reversePositionIndex(index: Int) =\n   if (index in 0..size) size - index else throw IndexOutOfBoundsException(\"Position index \$index must be in range [\${0..size}].\")\n\n\n/**\n * Returns a reversed read-only view of the original List.\n * All changes made in the original list will be reflected in the reversed one.\n * @sample samples.collections.ReversedViews.asReversedList\n */\npublic fun <T> List<T>.asReversed(): List<T> = ReversedListReadOnly(this)\n\n/**\n * Returns a reversed mutable view of the original mutable List.\n * All changes made in the original list will be reflected in the reversed one and vice versa.\n * @sample samples.collections.ReversedViews.asReversedMutableList\n */\n@kotlin.jvm.JvmName(\"asReversedMutable\")\npublic fun <T> MutableList<T>.asReversed(): MutableList<T> = ReversedList(this)\n\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed

on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.collections\n\nimport kotlin.coroutines.experimental.buildIterator\n\ninternal fun checkWindowSizeStep(size: Int, step: Int) {\n   require(size > 0 && step > 0) {\n   if (size != step)\n \"Both size $size and step $step must be greater than zero.\"\n   else\n   \"size $size must be greater than zero.\"\n   }\n}\n\ninternal fun <T> Sequence<T>.windowedSequence(size: Int, step: Int, partialWindows: Boolean, reuseBuffer: Boolean): Sequence<List<T>> {\n   checkWindowSizeStep(size, step)\n   return Sequence { windowedIterator(iterator(), size, step, partialWindows, reuseBuffer) }\n}\n\ninternal fun <T> windowedIterator(iterator: Iterator<T>, size: Int, step: Int, partialWindows: Boolean, reuseBuffer: Boolean): Iterator<List<T>> {\n   if (!iterator.hasNext()) return EmptyIterator\n   return buildIterator<List<T>> {\n   val gap = step - size\n   if (gap >= 0) {\n   var buffer = ArrayList<T>(size)\n   var skip = 0\n   for (e in iterator) {\n   if (skip > 0) { skip -= 1; continue }\n   buffer.add(e)\n   if (buffer.size == size) {\n   yield(buffer)\n   if (reuseBuffer) buffer.clear() else buffer = ArrayList(size)\n   skip = gap\n   }\n   }\n   if (buffer.isNotEmpty()) {\n   if (partialWindows || buffer.size == size) yield(buffer)\n   }\n   } else {\n   val buffer = RingBuffer<T>(size)\n   for (e in iterator) {\n   buffer.add(e)\n   if (buffer.isFull()) {\n   yield(if (reuseBuffer) buffer else ArrayList(buffer))\n   buffer.removeFirst(step)\n   }\n   }\n   if (partialWindows) {\n   while (buffer.size > step) {\n   yield(if (reuseBuffer) buffer else ArrayList(buffer))\n   buffer.removeFirst(step)\n   }\n   if (buffer.isNotEmpty()) yield(buffer)\n   }\n   }\n   }\n}\n\ninternal class MovingSubList<out E>(private val list: List<E>) : AbstractList<E>(), RandomAccess {\n   private var fromIndex: Int = 0\n   private var _size: Int = 0\n\n   fun move(fromIndex: Int, toIndex: Int) {\n   checkRangeIndexes(fromIndex, toIndex, list.size)\n   this.fromIndex = fromIndex\n   this._size = toIndex - fromIndex\n   }\n\n   override fun get(index: Int): E {\n   checkElementIndex(index, _size)\n\n   return list[fromIndex + index]\n   }\n\n   override val size: Int get() = _size\n}\n\n/**\n * Provides ring buffer implementation.\n *\n * Buffer overflow is not allowed so [add] doesn't overwrite tail but raises an exception.\n */\nprivate class RingBuffer<T>(val capacity: Int): AbstractList<T>(), RandomAccess {\n   init {\n   require(capacity >= 0) { \"ring buffer capacity should not be negative but it is $capacity\" }\n   }\n\n   private val buffer = arrayOfNulls<Any?>(capacity)\n   private var startIndex: Int = 0\n\n   override var size: Int = 0\n   private set\n\n   override fun get(index: Int): T {\n   checkElementIndex(index, size)\n   @Suppress(\"UNCHECKED_CAST\")\n   return buffer[startIndex.forward(index)] as T\n   }\n\n   fun isFull() = size == capacity\n\n   override fun iterator(): Iterator<T> = object : AbstractIterator<T>() {\n   private var count = size\n   private var index = startIndex\n\n   override fun computeNext() {\n   if (count == 0) {\n   done()\n   } else {\n   @Suppress(\"UNCHECKED_CAST\")\n   setNext(buffer[index] as T)\n   index = index.forward(1)\n   count--\n   }\n   }\n   }\n\n   @Suppress(\"UNCHECKED_CAST\")\n   override fun <T> toArray(array: Array<T>): Array<T> {\n   val result: Array<T?> =\n   if (array.size < this.size) array.copyOf(this.size) else array as Array<T?>\n\n   val size = this.size\n\n   var widx = 0\n   var idx = startIndex\n\n   while (widx < size && idx < capacity) {\n   result[widx] = buffer[idx] as T\n   widx++\n   idx++\n   }\n\n   idx = 0\n   while (widx < size) {\n   result[widx] = buffer[idx] as T\n   widx++\n   idx++\n   }\n   if (result.size > this.size) result[this.size] = null\n\n   return result as Array<T>\n   }\n\n   override fun toArray(): Array<Any?> {\n   return toArray(arrayOfNulls(size))\n   }\n\n   /**\n   * Add [element] to the buffer or fail with [IllegalStateException] if no free space available in the buffer\n   */\n   fun add(element: T) {\n   if (isFull()) {\n   throw IllegalStateException(\"ring buffer is full\")\n   }\n\n   buffer[startIndex.forward(size)] = element\n   size++\n   }\n\n   /**\n   * Removes [n] first elements from the buffer or fails with [IllegalArgumentException] if not enough elements in the buffer to remove\n   */\n   fun removeFirst(n: Int) {\n   require(n >= 0) { \"n shouldn't be negative but it is $n\" }\n   require(n <= size) { \"n shouldn't be greater than the buffer size: n = $n, size = $size\" }\n\n   if (n > 0) {\n   val start = startIndex\n   val end = start.forward(n)\n\n   if (start > end) {\n   buffer.fill(null, start, capacity)\n

buffer.fill(null, 0, end)\n   } else {\n   buffer.fill(null, start, end)\n   }\n\n   startIndex = end\n   size -= n\n   }\n   }\n\n\n   @Suppress(\"NOTHING_TO_INLINE\")\n   private inline fun Int.forward(n: Int): Int = (this + n) % capacity\n\n   // TODO: replace with Array.fill from stdlib when available in common\n   private fun <T> Array<T>.fill(element: T, fromIndex: Int = 0, toIndex: Int = size): Unit {\n   for (idx in fromIndex until toIndex) {\n   this[idx] = element\n   }\n   }\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental\n\n/**\n * Marks coroutine context element that intercepts coroutine continuations.\n * The coroutines framework uses [ContinuationInterceptor.Key] to retrieve the interceptor and\n * intercepts all coroutine continuations with [interceptContinuation] invocations.\n */\n@SinceKotlin(\"1.1\")\npublic interface ContinuationInterceptor : CoroutineContext.Element {\n   /**\n   * The key that defines *the* context interceptor.\n   */\n   companion object Key : CoroutineContext.Key<ContinuationInterceptor>\n\n   /**\n   * Returns continuation that wraps the original [continuation], thus intercepting all resumptions.\n   * This function is invoked by coroutines framework when needed and the resulting continuations are\n   * cached internally per each instance of the original [continuation].\n   *\n   * By convention, implementations that install themselves as *the*\n   * interceptor in the context with\n   * the [Key] shall also scan the context for other element that implement\n   * [ContinuationInterceptor] interface\n   * and use their [interceptContinuation] functions, too.\n   */\n   public fun <T> interceptContinuation(continuation: Continuation<T>): Continuation<T>\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental\n\n/**\n * Persistent context for the coroutine. It is an indexed set of [Element] instances.\n * An indexed set is a mix between a set and a map.\n * Every element in this set has a unique [Key].\n * Keys are compared _by reference_.\n */\n@SinceKotlin(\"1.1\")\npublic interface CoroutineContext {\n   /**\n   * Returns the element with the given [key] from this context or `null`.\n   * Keys are compared _by reference_, that is to get an element from the context the reference to its actual key\n   * object must be presented to this function.\n   */\n   public operator fun <E : Element> get(key: Key<E>): E?\n\n   /**\n   * Accumulates entries of this context starting with [initial] value and applying [operation]\n   * from left to right to current accumulator value and each element of this context.\n   */\n   public fun <R> fold(initial: R, operation: (R, Element) -> R): R\n\n   /**\n   * Returns a context containing elements from this context and elements from other [context].\n   * The elements from this context with the same key as in the other one are dropped.\n   */\n   public operator fun plus(context: CoroutineContext): CoroutineContext =\n   if (context === EmptyCoroutineContext) this else // fast path -- avoid lambda creation\n   context.fold(this) { acc, element ->\n   val removed = acc.minusKey(element.key)\n   if (removed === EmptyCoroutineContext) element else {\n   // make sure interceptor is always last in the context (and thus is fast to get when present)\n   val interceptor = removed[ContinuationInterceptor]\n   if (interceptor == null) CombinedContext(removed, element) else {\n   val left = removed.minusKey(ContinuationInterceptor)\n   if (left === EmptyCoroutineContext) CombinedContext(element, interceptor) else\n   CombinedContext(CombinedContext(left, element), interceptor)\n   }\n   }\n   }\n\n   /**\n   * Returns a context containing elements from this context, but without an element with\n   * the specified [key]. Keys are compared _by reference_, that is to remove an element from the context\n   * the reference to its

actual key object must be presented to this function.\n   */\n   public fun minusKey(key: Key<*>): CoroutineContext\n\n   /**\n   * An element of the [CoroutineContext]. An element of the coroutine context is a singleton context by itself.\n   */\n   public interface Element : CoroutineContext {\n   /**\n   * A key of this coroutine context element.\n   */\n   public val key: Key<*>\n\n   @Suppress(\"UNCHECKED_CAST\")\n   public override operator fun <E : Element> get(key: Key<E>): E? =\n   if (this.key === key) this as E else null\n\n   public override fun <R> fold(initial: R, operation: (R, Element) -> R): R =\n   operation(initial, this)\n\n   public override fun minusKey(key: Key<*>): CoroutineContext =\n   if (this.key === key) EmptyCoroutineContext else this\n   }\n\n   /**\n   * Key for the elements of [CoroutineContext]. [E] is a type of element with this key.\n   * Keys in the context are compared _by reference_.\n   */\n   public interface Key<E : Element>\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental\n\nimport kotlin.coroutines.experimental.CoroutineContext.*\n\n/**\n * Base class for [CoroutineContext.Element] implementations.\n */\n@SinceKotlin(\"1.1\")\npublic abstract class AbstractCoroutineContextElement(public override val key: Key<*>) : Element\n\n/**\n * An empty coroutine context.\n */\n@SinceKotlin(\"1.1\")\npublic object EmptyCoroutineContext : CoroutineContext {\n   public override fun <E : Element> get(key: Key<E>): E? = null\n   public override fun <R> fold(initial: R, operation: (R, Element) -> R): R = initial\n   public override fun plus(context: CoroutineContext): CoroutineContext = context\n   public override fun minusKey(key: Key<*>): CoroutineContext = this\n   public override fun hashCode(): Int = 0\n   public override fun toString(): String = \"EmptyCoroutineContext\"\n}\n\n//--------------------- internal impl ---------------------\n\n// this class is not exposed, but is hidden inside implementations\n// this is a left-biased list, so that `plus` works naturally\ninternal class CombinedContext(val left: CoroutineContext, val element: Element) : CoroutineContext {\n   override fun <E : Element> get(key: Key<E>): E? {\n   var cur = this\n   while (true) {\n   cur.element[key]?.let { return it }\n   val next = cur.left\n   if (next is CombinedContext) {\n   cur = next\n   } else {\n   return next[key]\n   }\n   }\n   }\n\n   public override fun <R> fold(initial: R, operation: (R, Element) -> R): R =\n   operation(left.fold(initial, operation), element)\n\n   public override fun minusKey(key: Key<*>): CoroutineContext {\n   element[key]?.let { return left }\n   val newLeft = left.minusKey(key)\n   return when {\n   newLeft === left -> this\n   newLeft === EmptyCoroutineContext -> element\n   else -> CombinedContext(newLeft, element)\n   }\n   }\n\n   private fun size(): Int =\n   if (left is CombinedContext) left.size() + 1 else 2\n\n   private fun contains(element: Element): Boolean =\n   get(element.key) == element\n\n   private fun containsAll(context: CombinedContext): Boolean {\n   var cur = context\n   while (true) {\n   if (!contains(cur.element)) return false\n   val next = cur.left\n   if (next is CombinedContext) {\n   cur = next\n   } else {\n   return contains(next as Element)\n   }\n   }\n   }\n\n   override fun equals(other: Any?): Boolean =\n   this === other || other is CombinedContext && other.size() == size() && other.containsAll(this)\n\n   override fun hashCode(): Int = left.hashCode() + element.hashCode()\n\n   override fun toString(): String =\n   \"[\" + fold(\"\") { acc, element ->\n   if (acc.isEmpty()) element.toString() else acc + \", \" + element\n   } + \"]\"\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental\n\n/**\n * Interface representing a continuation after a

suspension point that returns value of type `T`.\n */\n@SinceKotlin(\"1.1\")\npublic interface Continuation<in T> {\n /**\n * Context of the coroutine that corresponds to this continuation.\n */\n public val context: CoroutineContext\n\n /**\n * Resumes the execution of the corresponding coroutine passing [value] as the return value of the last suspension point.\n */\n public fun resume(value: T)\n\n /**\n * Resumes the execution of the corresponding coroutine so that the [exception] is re-thrown right after the\n * last suspension point.\n */\n public fun resumeWithException(exception: Throwable)\n}\n\n/**\n * Classes and interfaces marked with this annotation are restricted when used as receivers for extension\n * `suspend` functions. These `suspend` extensions can only invoke other member or extension `suspend` functions on this particular\n * receiver only and are restricted from calling arbitrary suspension functions.\n */\n@SinceKotlin(\"1.1\")\n@Target(AnnotationTarget.CLASS)\n@Retention(AnnotationRetention.BINARY)\npublic annotation class RestrictsSuspension\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n@file:kotlin.jvm.JvmName(\"CoroutinesKt\")\npackage kotlin.coroutines.experimental\n\nimport kotlin.coroutines.experimental.intrinsics.COROUTINE_SUSPENDED\nimport kotlin.coroutines.experimental.intrinsics.createCoroutineUnchecked\nimport kotlin.coroutines.experimental.intrinsics.suspendCoroutineOrReturn\nimport kotlin.internal.InlineOnly\n\n/**\n * Starts coroutine with receiver type [R] and result type [T].\n * This function creates and start a new, fresh instance of suspendable computation every time it is invoked.\n * The [completion] continuation is invoked when coroutine completes with result or exception.\n */\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\npublic fun <R, T> (suspend R.() -> T).startCoroutine(\n receiver: R,\n completion: Continuation<T>\n) {\n createCoroutineUnchecked(receiver, completion).resume(Unit)\n}\n\n/**\n * Starts coroutine without receiver and with result type [T].\n * This function creates and start a new, fresh instance of suspendable computation every time it is invoked.\n * The [completion] continuation is invoked when coroutine completes with result or exception.\n */\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\npublic fun <T> (suspend () -> T).startCoroutine(\n completion: Continuation<T>\n) {\n createCoroutineUnchecked(completion).resume(Unit)\n}\n\n/**\n * Creates a coroutine with receiver type [R] and result type [T].\n * This function creates a new, fresh instance of suspendable computation every time it is invoked.\n *\n * To start executing the created coroutine, invoke `resume(Unit)` on the returned [Continuation] instance.\n * The [completion] continuation is invoked when coroutine completes with result or exception.\n * Repeated invocation of any resume function on the resulting continuation produces [IllegalStateException].\n */\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\npublic fun <R, T> (suspend R.() -> T).createCoroutine(\n receiver: R,\n completion: Continuation<T>\n): Continuation<Unit> =\n SafeContinuation(createCoroutineUnchecked(receiver, completion), COROUTINE_SUSPENDED)\n\n/**\n * Creates a coroutine without receiver and with result type [T].\n * This function creates a new, fresh instance of suspendable computation every time it is invoked.\n *\n * To start executing the created coroutine, invoke `resume(Unit)` on the returned [Continuation] instance.\n * The [completion] continuation is invoked when coroutine completes with result or exception.\n * Repeated invocation of any resume function on the resulting continuation produces [IllegalStateException].\n */\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\npublic fun <T> (suspend () -> T).createCoroutine(\n completion: Continuation<T>\n): Continuation<Unit> =\n SafeContinuation(createCoroutineUnchecked(completion), COROUTINE_SUSPENDED)\n\n/**\n * Obtains the current continuation instance inside suspend functions and suspends\n * currently running coroutine.\n *\n * In this function both [Continuation.resume] and [Continuation.resumeWithException] can be used either synchronously in\n * the same stack-frame where suspension function is run or asynchronously later in the same thread or\n * from

a different thread of execution. Repeated invocation of any resume function produces [IllegalStateException].\n *\n@SinceKotlin(\"1.1\")\npublic suspend inline fun <T> suspendCoroutine(crossinline block: (Continuation<T>) -> Unit): T =\n   suspendCoroutineOrReturn { c: Continuation<T> ->\n   val safe = SafeContinuation(c)\n   block(safe)\n   safe.getResult()\n   }\n\n/**\n * Continuation context of current coroutine.\n *\n * This allows the user code to not pass an extra [CoroutineContext] parameter in basic coroutine builders\n * like [launch](https://kotlin.github.io/kotlinx.coroutines/kotlinx-coroutines-core/kotlinx.coroutines.experimental/launch.html)\n * and [async](https://kotlin.github.io/kotlinx.coroutines/kotlinx-coroutines-core/kotlinx.coroutines.experimental/async.html),\n * but still provide easy access to coroutine context.\n *\n@SinceKotlin(\"1.2\")\n@Suppress(\"WRONG_MODIFIER_TARGET\")\n@InlineOnly\npublic suspend inline val coroutineContext: CoroutineContext\n   get() {\n   throw NotImplementedError(\"Implemented as intrinsic\")\n   }\n\n\n// INTERNAL DECLARATIONS\n\n@kotlin.internal.InlineOnly\ninternal inline fun processBareContinuationResume(completion: Continuation<*>, block: () -> Any?) {\n   try {\n   val result = block()\n   if (result !== COROUTINE_SUSPENDED) {\n   @Suppress(\"UNCHECKED_CAST\")\n   (completion as Continuation<Any?>).resume(result)\n   }\n   } catch (t: Throwable) {\n   completion.resumeWithException(t)\n   }\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"SequenceBuilderKt\")\npackage kotlin.coroutines.experimental\n\nimport kotlin.coroutines.experimental.intrinsics.*\n\n/**\n * Builds a [Sequence] lazily yielding values one by one.\n *\n * @see kotlin.sequences.generateSequence\n *\n * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n * @sample samples.collections.Sequences.Building.buildFibonacciSequence\n *\n@SinceKotlin(\"1.1\")\npublic fun <T> buildSequence(builderAction: suspend SequenceBuilder<T>.() -> Unit): Sequence<T> = Sequence {
buildIterator(builderAction) }\n\n/**\n * Builds an [Iterator] lazily yielding values one by one.\n *\n * @sample samples.collections.Sequences.Building.buildIterator\n * @sample samples.collections.Iterables.Building.iterable\n *\n@SinceKotlin(\"1.1\")\npublic fun <T> buildIterator(builderAction: suspend SequenceBuilder<T>.() -> Unit): Iterator<T> {\n   val iterator = SequenceBuilderIterator<T>()\n   iterator.nextStep = builderAction.createCoroutineUnchecked(receiver = iterator, completion = iterator)\n   return iterator\n}\n\n/**\n * Builder for a [Sequence] or an [Iterator], provides [yield] and [yieldAll] suspension functions.\n *\n * @see buildSequence\n * @see buildIterator\n *\n * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n * @sample samples.collections.Sequences.Building.buildFibonacciSequence\n *\n@RestrictsSuspension\n@SinceKotlin(\"1.1\")\npublic abstract class SequenceBuilder<in T> internal constructor() {\n   /**\n   * Yields a value to the [Iterator] being built.\n   *\n   * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n   * @sample samples.collections.Sequences.Building.buildFibonacciSequence\n   */\n   public abstract suspend fun yield(value: T)\n\n   /**\n   * Yields all values from the `iterator` to the [Iterator] being built.\n   *\n   * The sequence of values returned by the given iterator can be potentially infinite.\n   *\n   * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n   */\n   public abstract suspend fun yieldAll(iterator: Iterator<T>)\n\n   /**\n   * Yields a collections of values to the [Iterator] being built.\n   *\n   * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n   */\n   public suspend fun yieldAll(elements: Iterable<T>) {\n   if (elements is Collection && elements.isEmpty()) return\n   return yieldAll(elements.iterator())\n   }\n\n   /**\n   * Yields potentially infinite sequence of values to the [Iterator] being built.\n   *\n   * The sequence can be potentially infinite.\n   *\n   * @sample samples.collections.Sequences.Building.buildSequenceYieldAll\n   */\n   public suspend fun yieldAll(sequence:

Sequence<T>) = yieldAll(sequence.iterator())\n}\n\nprivate typealias State = Int\nprivate const val State_NotReady: State = 0\nprivate const val State_ManyNotReady: State = 1\nprivate const val State_ManyReady: State = 2\nprivate const val State_Ready: State = 3\nprivate const val State_Done: State = 4\nprivate const val State_Failed: State = 5\n\nprivate class SequenceBuilderIterator<T> : SequenceBuilder<T>(), Iterator<T>, Continuation<Unit> {\n   private var state = State_NotReady\n   private var nextValue: T? = null\n   private var nextIterator: Iterator<T>? = null\n   var nextStep: Continuation<Unit>? = null\n\n   override fun hasNext(): Boolean {\n   while (true) {\n   when (state) {\n   State_NotReady -> {}\n   State_ManyNotReady ->\n   if (nextIterator!!.hasNext()) {\n   state = State_ManyReady\n   return true\n   } else {\n   nextIterator = null\n   }\n   State_Done -> return false\n   State_Ready, State_ManyReady -> return true\n   else -> throw exceptionalState()\n   }\n\n   state = State_Failed\n   val step = nextStep!!\n   nextStep = null\n   step.resume(Unit)\n   }\n   }\n\n   override fun next(): T {\n   when (state) {\n   State_NotReady, State_ManyNotReady -> return nextNotReady()\n   State_ManyReady -> {\n   state = State_ManyNotReady\n   return nextIterator!!.next()\n   }\n   State_Ready -> {\n   state = State_NotReady\n   @Suppress(\"UNCHECKED_CAST\") \n   val result = nextValue as T\n   nextValue = null\n   return result\n   }\n   else -> throw exceptionalState()\n   }\n   }\n\n   private fun nextNotReady(): T {\n   if (!hasNext()) throw NoSuchElementException() else return next()\n   }\n\n   private fun exceptionalState(): Throwable = when (state) {\n   State_Done -> NoSuchElementException()\n   State_Failed -> IllegalStateException(\"Iterator has failed.\")\n   else -> IllegalStateException(\"Unexpected state of the iterator: $state\")\n   }\n\n   suspend override fun yield(value: T) {\n   nextValue = value\n   state = State_Ready\n   return suspendCoroutineOrReturn { c ->\n   nextStep = c\n   COROUTINE_SUSPENDED\n   }\n   }\n\n   suspend override fun yieldAll(iterator: Iterator<T>) {\n   if (!iterator.hasNext()) return\n   nextIterator = iterator\n   state = State_ManyReady\n   return suspendCoroutineOrReturn { c ->\n   nextStep = c\n   COROUTINE_SUSPENDED\n   }\n   }\n\n   // Completion continuation implementation\n   override fun resume(value: Unit) {\n   state = State_Done\n   }\n\n   override fun resumeWithException(exception: Throwable) {\n   throw exception // just rethrow\n   }\n\n   override val context: CoroutineContext\n   get() = EmptyCoroutineContext\n}\n","/*\n * Copyright 2010-2018 JetBrains s.r.o. Use of this source code is governed by the Apache 2.0 license\n * that can be found in the license/LICENSE.txt file.\n */\n\n@file:kotlin.jvm.JvmName(\"IntrinsicsKt\")\n\npackage kotlin.coroutines.experimental.intrinsics\n\nimport kotlin.coroutines.experimental.*\n\n/**\n * Obtains the current continuation instance inside suspend functions and either suspends\n * currently running coroutine or returns result immediately without suspension.\n *\n * If the [block] returns the special [COROUTINE_SUSPENDED] value, it means that suspend function did suspend the execution and will\n * not return any result immediately. In this case, the [Continuation] provided to the [block] shall be invoked at some moment in the\n * future when the result becomes available to resume the computation.\n *\n * Otherwise, the return value of the [block] must have a type assignable to [T] and represents the result of this suspend function.\n * It means that the execution was not suspended and the [Continuation] provided to the [block] shall not be invoked.\n * As the result type of the [block] is declared as `Any?` and cannot be correctly type-checked,\n * its proper return type remains on the conscience of the suspend function's author.\n *\n * Note that it is not recommended to call either [Continuation.resume] nor [Continuation.resumeWithException] functions synchronously\n * in the same stackframe where suspension function is run. Use [suspendCoroutine] as a safer way to obtain current\n * continuation instance.\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\n@Suppress(\"UNUSED_PARAMETER\")\npublic suspend inline fun <T> suspendCoroutineOrReturn(crossinline block: (Continuation<T>) -> Any?): T =\n   suspendCoroutineUninterceptedOrReturn { cont -> block(cont.intercepted()) }\n\n/**\n * Obtains the current continuation instance inside suspend functions and either suspends\n * currently running coroutine or returns result immediately without suspension.\n *\n * Unlike [suspendCoroutineOrReturn] it does not intercept continuation.\n */\n@SinceKotlin(\"1.2\")\n@kotlin.internal.InlineOnly\npublic suspend inline fun <T> suspendCoroutineUninterceptedOrReturn(crossinline block: (Continuation<T>) -> Any?): T =\n   throw

NotImplementedError(\"Implementation of suspendCoroutineUninterceptedOrReturn is intrinsic\")\n\n/**\n * Intercept continuation with [ContinuationInterceptor].\n *\n@SinceKotlin(\"1.2\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> Continuation<T>.intercepted(): Continuation<T> =\n   throw NotImplementedError(\"Implementation of intercepted is intrinsic\")\n\n/**\n * Continuation context of current coroutine.\n *\n * This allows the user code to not pass an extra [CoroutineContext] parameter in basic coroutine builders\n * like [launch](https://kotlin.github.io/kotlinx.coroutines/kotlinx-coroutines-core/kotlinx.coroutines.experimental/launch.html)\n * and [async](https://kotlin.github.io/kotlinx.coroutines/kotlinx-coroutines-core/kotlinx.coroutines.experimental/async.html),\n * but still provide easy access to coroutine context.\n *\n@SinceKotlin(\"1.2\")\n@Suppress(\"WRONG_MODIFIER_TARGET\")\n@Deprecated(\n   \"Use kotlin.coroutines.experimental.coroutineContext instead\",\n   ReplaceWith(\"kotlin.coroutines.experimental.coroutineContext\"),\n   DeprecationLevel.ERROR\n)\npublic suspend inline val coroutineContext: CoroutineContext\n   get() {\n   throw NotImplementedError(\"Implemented as intrinsic\")\n   }\n\n/**\n * This value is used as a return value of [suspendCoroutineOrReturn] `block` argument to state that\n * the execution was suspended and will not return any result immediately.\n *\n@SinceKotlin(\"1.1\")\npublic val COROUTINE_SUSPENDED: Any = Any()\n\n// JVM declarations\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n// INTERNAL DEFINITIONS\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.experimental\n\n/** Performs a bitwise AND operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Byte.and(other: Byte): Byte = (this.toInt() and other.toInt()).toByte()\n/** Performs a bitwise OR operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Byte.or(other: Byte): Byte = (this.toInt() or other.toInt()).toByte()\n/** Performs a bitwise XOR operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Byte.xor(other: Byte): Byte = (this.toInt() xor other.toInt()).toByte()\n/** Inverts the bits in this value. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun Byte.inv(): Byte = (this.toInt().inv()).toByte()\n\n\n/** Performs a bitwise AND operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Short.and(other: Short): Short = (this.toInt() and other.toInt()).toShort()\n/** Performs a bitwise OR operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Short.or(other: Short): Short = (this.toInt() or other.toInt()).toShort()\n/** Performs a bitwise XOR operation between the two values. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline infix fun Short.xor(other: Short): Short = (this.toInt() xor other.toInt()).toShort()\n/** Inverts the bits in this value. *\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun Short.inv(): Short = (this.toInt().inv()).toShort()\n\n\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.internal\n\n/**\n * Specifies that the corresponding type should be ignored during type inference.\n *\n@Target(AnnotationTarget.TYPE)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class NoInfer\n\n/**\n * Specifies that the constraint built for the type during type inference should be an equality one.\n

*/\n@Target(AnnotationTarget.TYPE)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class Exact\n\n/**\n * Specifies that a corresponding member has the lowest priority in overload resolution.\n */\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class LowPriorityInOverloadResolution\n\n/**\n * Specifies that the corresponding member has the highest priority in overload resolution. Effectively this means that\n * an extension annotated with this annotation will win in overload resolution over a member with the same signature.\n */\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class HidesMembers\n\n/**\n * The value of this type parameter should be mentioned in input types (argument types, receiver type or expected type).\n */\n@Target(AnnotationTarget.TYPE_PARAMETER)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class OnlyInputTypes\n\n/**\n * Specifies that this function should not be called directly without inlining\n */\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY, AnnotationTarget.PROPERTY_GETTER, AnnotationTarget.PROPERTY_SETTER)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class InlineOnly\n\n/**\n * Specifies that this declaration can have dynamic receiver type.\n */\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY)\n@Retention(AnnotationRetention.BINARY)\ninternal annotation class DynamicExtension\n\n/**\n * The value of this parameter should be a property reference expression (`this::foo`), referencing a `lateinit` property,\n * the backing field of which is accessible at the point where the corresponding argument is passed.\n */\n@Target(AnnotationTarget.VALUE_PARAMETER)\n@Retention(AnnotationRetention.BINARY)\n@SinceKotlin(\"1.2\")\ninternal annotation class AccessibleLateinitPropertyLiteral\n\n/**\n * Specifies that this declaration is only completely supported since the specified version.\n *\n * The Kotlin compiler of an earlier version is going to report a diagnostic on usages of this declaration.\n * The diagnostic message can be specified with [message], or via [errorCode] (takes less space, but might not be immediately clear\n * to the user). The diagnostic severity can be specified with [level]: WARNING/ERROR mean that either a warning or an error\n * is going to be reported, HIDDEN means that the declaration is going to be removed from resolution completely.\n *\n * [versionKind] specifies which version should be compared with the [version] value, when compiling the usage of the annotated\n * declaration.\n * Note that prior to 1.2, only [RequireKotlinVersionKind.LANGUAGE_VERSION] was supported, so the Kotlin compiler before 1.2 is going to\n * treat any [RequireKotlin] as if it requires the language version. Since 1.2, the Kotlin compiler supports\n * [RequireKotlinVersionKind.LANGUAGE_VERSION], [RequireKotlinVersionKind.COMPILER_VERSION] and [RequireKotlinVersionKind.API_VERSION].\n * If the actual value of [versionKind] is something different (e.g. a new version kind, added in future versions of Kotlin),\n * Kotlin 1.2 is going to ignore this [RequireKotlin] altogether, where as Kotlin before 1.2 is going to treat this as a\n * requirement\n * on the language version.\n *\n * This annotation is erased at compile time; its arguments are stored in a more compact form in the Kotlin metadata.\n */\n@Target(AnnotationTarget.CLASS, AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY, AnnotationTarget.CONSTRUCTOR, AnnotationTarget.TYPEALIAS)\n@Retention(AnnotationRetention.SOURCE)\n@SinceKotlin(\"1.2\")\ninternal annotation class RequireKotlin(\n   val version: String,\n   val message: String = \"\",\n   val level: DeprecationLevel = DeprecationLevel.ERROR,\n   val versionKind: RequireKotlinVersionKind = RequireKotlinVersionKind.LANGUAGE_VERSION,\n   val errorCode: Int = -1\n)\n\n/**\n * The kind of the version that is required by [RequireKotlin].\n */\n@SinceKotlin(\"1.2\")\ninternal enum class RequireKotlinVersionKind {\n   LANGUAGE_VERSION,\n   COMPILER_VERSION,\n   API_VERSION,\n}\n\n/**\n * Specifies that this declaration is a part of special DSL, used for constructing function's contract.\n */\n@Retention(AnnotationRetention.BINARY)\n@SinceKotlin(\"1.2\")\ninternal annotation class ContractsDsl\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may

obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.internal.contracts\n\nimport kotlin.internal.ContractsDsl\n\nimport kotlin.internal.InlineOnly\n\n@ContractsDsl\n@SinceKotlin(\"1.2\")\ninternal interface ContractBuilder {\n @ContractsDsl fun returns(): Returns\n @ContractsDsl fun returns(value: Any?): Returns\n @ContractsDsl fun returnsNotNull(): ReturnsNotNull\n @ContractsDsl fun <R> callsInPlace(lambda: Function<R>, kind: InvocationKind = InvocationKind.UNKNOWN): CallsInPlace\n}\n\n\n@ContractsDsl\n@SinceKotlin(\"1.2\")\ninternal enum class InvocationKind {\n @ContractsDsl AT_MOST_ONCE,\n @ContractsDsl AT_LEAST_ONCE,\n @ContractsDsl EXACTLY_ONCE,\n @ContractsDsl UNKNOWN\n}\n\n\n@ContractsDsl\n@InlineOnly\n@SinceKotlin(\"1.2\")\ninternal inline fun contract(builder: ContractBuilder.() -> Unit) { }","package kotlin.properties\n\nimport kotlin.reflect.KProperty\n\n/**\n * Standard property delegates.\n */\npublic object Delegates {\n /**\n * Returns a property delegate for a read/write property with a non-`null` value that is initialized not during\n * object construction time but at a later time. Trying to read the property before the initial value has been\n * assigned results in an exception.\n *\n * @sample samples.properties.Delegates.notNullDelegate\n */\n public fun <T: Any> notNull(): ReadWriteProperty<Any?, T> = NotNullVar()\n\n /**\n * Returns a property delegate for a read/write property that calls a specified callback function when changed.\n * @param initialValue the initial value of the property.\n * @param onChange the callback which is called after the change of the property is made. The value of the property\n * has already been changed when this callback is invoked.\n *\n * @sample samples.properties.Delegates.observableDelegate\n */\n public inline fun <T> observable(initialValue: T, crossinline onChange: (property: KProperty<*>, oldValue: T, newValue: T) -> Unit):\n ReadWriteProperty<Any?, T> = object : ObservableProperty<T>(initialValue) {\n override fun afterChange(property: KProperty<*>, oldValue: T, newValue: T) = onChange(property, oldValue, newValue)\n }\n\n /**\n * Returns a property delegate for a read/write property that calls a specified callback function when changed,\n * allowing the callback to veto the modification.\n * @param initialValue the initial value of the property.\n * @param onChange the callback which is called before a change to the property value is attempted.\n * The value of the property hasn't been changed yet, when this callback is invoked.\n * If the callback returns `true` the value of the property is being set to the new value,\n * and if the callback returns `false` the new value is discarded and the property remains its old value.\n *\n * @sample samples.properties.Delegates.vetoableDelegate\n * @sample samples.properties.Delegates.throwVetoableDelegate\n */\n public inline fun <T> vetoable(initialValue: T, crossinline onChange: (property: KProperty<*>, oldValue: T, newValue: T) -> Boolean):\n ReadWriteProperty<Any?, T> = object : ObservableProperty<T>(initialValue) {\n override fun beforeChange(property: KProperty<*>, oldValue: T, newValue: T): Boolean = onChange(property, oldValue, newValue)\n }\n}\n\n\nprivate class NotNullVar<T: Any>() : ReadWriteProperty<Any?, T> {\n private var value: T? = null\n\n public override fun getValue(thisRef: Any?, property: KProperty<*>): T {\n return value ?: throw IllegalStateException(\"Property ${property.name} should be initialized before get.\")\n }\n\n public override fun setValue(thisRef: Any?, property: KProperty<*>, value: T) {\n this.value = value\n }\n}\n\n","package kotlin.properties\n\nimport kotlin.reflect.KProperty\n\n/**\n * Implements the core logic of a property delegate for a read/write property that calls callback functions when changed.\n * @param initialValue the initial value of the property.\n */\npublic abstract class ObservableProperty<T>(initialValue: T) : ReadWriteProperty<Any?, T> {\n private var value = initialValue\n\n /**\n * The callback which is called before a change to the property value is attempted.\n * The value of the property hasn't been changed yet, when this callback is invoked.\n * If the callback returns `true` the value of the property is being set to the new value,\n * and if the callback returns `false` the new value is discarded and the property remains its old value.\n */\n

protected open fun beforeChange(property: KProperty<*>, oldValue: T, newValue: T): Boolean = true\n\n   /**\n * The callback which is called after the change of the property is made. The value of the property\n   * has already been changed when this callback is invoked.\n   */\n   protected open fun afterChange (property: KProperty<*>, oldValue: T, newValue: T): Unit {}\n\n   public override fun getValue(thisRef: Any?, property: KProperty<*>): T {\n   return value\n   }\n\n   public override fun setValue(thisRef: Any?, property: KProperty<*>, value: T) {\n   val oldValue = this.value\n   if (!beforeChange(property, oldValue, value)) {\n   return\n   }\n   this.value = value\n   afterChange(property, oldValue, value)\n   }\n}","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"RangesKt\")\npackage kotlin.ranges\n\n/**\n * Represents a range of floating point numbers.\n * Extends [ClosedRange] interface providing custom operation [lessThanOrEquals] for comparing values of range domain type.\n *\n * This interface is implemented by floating point ranges returned by [Float.rangeTo] and [Double.rangeTo] operators to\n * achieve IEEE-754 comparison order instead of total order of floating point numbers.\n */\n@SinceKotlin(\"1.1\")\npublic interface ClosedFloatingPointRange<T: Comparable<T>> : ClosedRange<T> {\n   override fun contains(value: T): Boolean = lessThanOrEquals(start, value) && lessThanOrEquals(value, endInclusive)\n   override fun isEmpty(): Boolean = !lessThanOrEquals(start, endInclusive)\n\n   /**\n   * Compares two values of range domain type and returns true if first is less than or equal to second.\n   */\n   fun lessThanOrEquals(a: T, b: T): Boolean\n}\n\n/**\n * Represents a range of [Comparable] values.\n */\nprivate open class ComparableRange<T: Comparable<T>> (\n   override val start: T,\n   override val endInclusive: T\n): ClosedRange<T> {\n\n   override fun equals(other: Any?): Boolean {\n   return other is ComparableRange<*> && (isEmpty() && other.isEmpty() ||\n   start == other.start && endInclusive == other.endInclusive)\n   }\n\n   override fun hashCode(): Int {\n   return if (isEmpty()) -1 else 31 * start.hashCode() + endInclusive.hashCode()\n   }\n\n   override fun toString(): String = \"$start..$endInclusive\"\n}\n\n/**\n * A closed range of values of type `Double`.\n *\n * Numbers are compared with the ends of this range according to IEEE-754.\n */\nprivate class ClosedDoubleRange (\n   start: Double,\n   endInclusive: Double\n) : ClosedFloatingPointRange<Double> {\n   private val _start = start\n   private val _endInclusive = endInclusive\n   override val start: Double get() = _start\n   override val endInclusive: Double get() = _endInclusive\n\n   override fun lessThanOrEquals(a: Double, b: Double): Boolean = a <= b\n\n   override fun contains(value: Double): Boolean = value >= _start && value <= _endInclusive\n   override fun isEmpty(): Boolean = !(_start <= _endInclusive)\n\n   override fun equals(other: Any?): Boolean {\n   return other is ClosedDoubleRange && (isEmpty() && other.isEmpty() ||\n   _start == other._start && _endInclusive == other._endInclusive)\n   }\n\n   override fun hashCode(): Int {\n   return if (isEmpty()) -1 else 31 * _start.hashCode() + _endInclusive.hashCode()\n   }\n   override fun toString(): String = \"$_start..$_endInclusive\"\n}\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n/**\n * Creates a range from this [Comparable] value to the specified [that] value.\n *\n * This value needs to be smaller than [that] value, otherwise the returned range will be empty.\n * @sample samples.ranges.Ranges.rangeFromComparable\n */\npublic operator fun <T: Comparable<T>> T.rangeTo(that: T): ClosedRange<T> = ComparableRange(this, that)\n\n/**\n * Creates a range from this [Double] value to the specified [that] value.\n *\n * Numbers are compared with the ends of this range according to IEEE-754.\n * @sample samples.ranges.Ranges.rangeFromDouble\n */\n@SinceKotlin(\"1.1\")\npublic operator fun Double.rangeTo(that: Double): ClosedFloatingPointRange<Double> = ClosedDoubleRange(this, that)\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\ninternal fun checkStepIsPositive(isPositive: Boolean, step: Number) {\n   if (!isPositive) throw IllegalArgumentException(\"Step must be positive, was: $step.\")\n}\n","/*\n * Copyright 2010-2014 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n

*/\n\n@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"CharsKt\")\n\npackage kotlin.text\n\n/**\n * Concatenates this Char and a String.\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun Char.plus(other: String) : String = this.toString() + other\n\n/**\n * Returns `true` if this character is equal to the [other] character, optionally ignoring character case.\n *\n * @param ignoreCase `true` to ignore character case when comparing characters. By default `false`.\n *\n * Two characters are considered the same ignoring case if at least one of the following is `true`:\n *   - The two characters are the same (as compared by the == operator)\n *   - Applying the method [toUpperCase] to each character produces the same result\n *   - Applying the method [toLowerCase] to each character produces the same result\n */\npublic fun Char.equals(other: Char, ignoreCase: Boolean = false): Boolean {\n   if (this == other) return true\n   if (!ignoreCase) return false\n\n   if (this.toUpperCase() == other.toUpperCase()) return true\n   if (this.toLowerCase() == other.toLowerCase()) return true\n   return false\n}\n\n/**\n * Returns `true` if this character is a Unicode surrogate code unit.\n */\npublic fun Char.isSurrogate(): Boolean = this in Char.MIN_SURROGATE..Char.MAX_SURROGATE\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.text\n\n// actually \\s is enough to match all whitespace, but \\xA0 added because of different regexp behavior of Rhino used in Selenium tests\npublic fun Char.isWhitespace(): Boolean = toString().matches(\"[\\\\s\\\\xA0]\")\n\n@kotlin.internal.InlineOnly\npublic inline fun Char.toLowerCase(): Char = js(\"String.fromCharCode\")(this).toLowerCase().charCodeAt(0)\n\n@kotlin.internal.InlineOnly\npublic inline fun Char.toUpperCase(): Char = js(\"String.fromCharCode\")(this).toUpperCase().charCodeAt(0)\n\n/**\n * Returns `true` if this character is a Unicode high-surrogate code unit (also known as leading-surrogate code unit).\n */\npublic fun Char.isHighSurrogate(): Boolean = this in Char.MIN_HIGH_SURROGATE..Char.MAX_HIGH_SURROGATE\n\n/**\n * Returns `true` if this character is a Unicode low-surrogate code unit (also known as trailing-surrogate code unit).\n */\npublic fun Char.isLowSurrogate(): Boolean = this in Char.MIN_LOW_SURROGATE..Char.MAX_LOW_SURROGATE\n","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n\npackage kotlin.text\n\n/**\n * Trims leading whitespace characters followed by [marginPrefix] from every line of a source string and removes\n * the first and the last lines if they are blank (notice difference blank vs empty).\n *\n * Doesn't affect a line if it doesn't contain [marginPrefix] except the first and the last blank lines.\n *\n * Doesn't preserve the original line endings.\n *\n * @param marginPrefix non-blank string, which is used as a margin delimiter. Default is `|` (pipe character).\n *\n * @sample samples.text.Strings.trimMargin\n * @see trimIndent\n * @see kotlin.text.isWhitespace\n */\npublic fun String.trimMargin(marginPrefix: String = \"|\"): String =\n   replaceIndentByMargin(\"\", marginPrefix)\n\n/**\n * Detects indent by [marginPrefix] as it does [trimMargin] and replace it with [newIndent].\n *\n * @param marginPrefix non-blank string, which is used as a margin delimiter. Default is `|` (pipe character).\n */\npublic fun String.replaceIndentByMargin(newIndent: String = \"\", marginPrefix: String = \"|\"): String {\n   require(marginPrefix.isNotBlank()) { \"marginPrefix must be non-blank string.\" }\n   val lines = lines()\n\n   return lines.reindent(length + newIndent.length * lines.size, getIndentFunction(newIndent), { line ->\n   val firstNonWhitespaceIndex = line.indexOfFirst { !it.isWhitespace() }\n\n   when {\n   firstNonWhitespaceIndex == -1 -> null\n   line.startsWith(marginPrefix, firstNonWhitespaceIndex) -> line.substring(firstNonWhitespaceIndex + marginPrefix.length)\n   else -> null\n   }\n   })\n}\n\n/**\n * Detects a common minimal indent of all the input lines, removes it from every line and also removes the first and the last\n * lines if they are blank (notice difference blank vs empty).\n *\n * Note that blank lines do not affect the detected indent level.\n *\n * In case if there are non-blank lines with no leading whitespace characters (no indent at all) then the\n * common indent is 0, and therefore this function doesn't change the indentation.\n *\n * Doesn't

preserve the original line endings.\n *\n * @sample samples.text.Strings.trimIndent\n * @see trimMargin\n * @see kotlin.text.isBlank\n */\npublic fun String.trimIndent(): String = replaceIndent(\"\")\n\n/**\n * Detects a common minimal indent like it does [trimIndent] and replaces it with the specified [newIndent].\n */\npublic fun String.replaceIndent(newIndent: String = \"\"): String {\n   val lines = lines()\n\n   val minCommonIndent = lines\n   .filter(String::isNotBlank)\n   .map(String::indentWidth)\n   .min() ?: 0\n\n   return lines.reindent(length + newIndent.length * lines.size, getIndentFunction(newIndent), { line -> line.drop(minCommonIndent) })\n}\n\n/**\n * Prepends [indent] to every line of the original string.\n *\n * Doesn't preserve the original line endings.\n */\npublic fun String.prependIndent(indent: String = "   "): String =\n   lineSequence()\n   .map {\n   when {\n   it.isBlank() -> {\n   when {\n   it.length < indent.length -> indent\n   else -> it\n   }\n   }\n   else -> indent + it\n   }\n   }\n   .joinToString(\"\\n\")\n\nprivate fun String.indentWidth(): Int = indexOfFirst { !it.isWhitespace() }.let { if (it == -1) length else it }\n\nprivate fun getIndentFunction(indent: String) = when {\n   indent.isEmpty() -> { line: String -> line }\n   else -> { line: String -> indent + line }\n}\n\nprivate inline fun List<String>.reindent(resultSizeEstimate: Int, indentAddFunction: (String) -> String, indentCutFunction: (String) -> String?): String {\n   val lastIndex = lastIndex\n   return mapIndexedNotNull { index, value ->\n   if ((index == 0 || index == lastIndex) && value.isBlank())\n   null\n   else\n   indentCutFunction(value)?.let(indentAddFunction) ?: value\n   }\n   .joinTo(StringBuilder(resultSizeEstimate), \"\\n\")\n   .toString()\n}\n","null,"@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n\npackage kotlin.text\n\n/**\n * Builds new string by populating newly created [StringBuilder] using provided [builderAction]\n * and then converting it to [String].\n */\n@kotlin.internal.InlineOnly\npublic inline fun buildString(builderAction: StringBuilder.() -> Unit): String =\n   StringBuilder().apply(builderAction).toString()\n\n/**\n * Builds new string by populating newly created [StringBuilder] initialized with the given [capacity]\n * using provided [builderAction] and then converting it to [String].\n */\n@SinceKotlin(\"1.1\")\n@kotlin.internal.InlineOnly\npublic inline fun buildString(capacity: Int, builderAction: StringBuilder.() -> Unit): String =\n   StringBuilder(capacity).apply(builderAction).toString()\n\n/**\n * Appends all arguments to the given [Appendable].\n */\npublic fun <T : Appendable> T.append(vararg value: CharSequence?): T {\n   for (item in value)\n   append(item)\n   return this\n}\n\n/**\n * Appends all arguments to the given StringBuilder.\n */\npublic fun StringBuilder.append(vararg value: String?): StringBuilder {\n   for (item in value)\n   append(item)\n   return this\n}\n\n/**\n * Appends all arguments to the given StringBuilder.\n */\npublic fun StringBuilder.append(vararg value: Any?): StringBuilder {\n   for (item in value)\n   append(item)\n   return this\n}\n\n/* Not available on platform: JS */\n\n\n\n\n\n\ninternal fun <T> Appendable.appendElement(element: T, transform: ((T) -> CharSequence)?) {\n   when {\n   transform != null -> append(transform(element))\n   element is CharSequence? -> append(element)\n   element is Char -> append(element)\n   else -> append(element.toString())\n   }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.text\n\nimport kotlin.js.RegExp\n\n/**\n * Provides enumeration values to use to set regular expression options.\n */\npublic enum class RegexOption(val value: String) {\n   /** Enables case-insensitive matching. */\n   IGNORE_CASE(\"i\"),\n   /** Enables multiline mode.\n   *\n   * In multiline mode the expressions `^` and `$` match just after or just before,\n   * respectively, a line terminator or the end of the input sequence. */\n   MULTILINE(\"m\")\n}\n\n/**\n * Represents the results from a single capturing group within a [MatchResult] of [Regex].\n *\n * @param value The value of captured group.\n */\npublic data class MatchGroup(val value: String)\n\n/** A compiled representation of a regular expression.\n *\n * For pattern syntax reference see [https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/RegExp] and

[http://www.w3schools.com/jsref/jsref_obj_regexp.asp]\n *\npublic class Regex(pattern: String, options: Set<RegexOption>) {\n\n   /** Creates a regular expression from the specified [pattern] string and the specified single [option]. */\n   public constructor(pattern: String, option: RegexOption) : this(pattern, setOf(option))\n\n   /** Creates a regular expression from the specified [pattern] string and the default options. */\n   public constructor(pattern: String) : this(pattern, emptySet())\n\n   /** The pattern string of this regular expression. */\n   public val pattern: String = pattern\n   /** The set of options that were used to create this regular expression. */\n   public val options: Set<RegexOption> = options.toSet()\n   private val nativePattern: RegExp = RegExp(pattern, options.map { it.value }.joinToString(separator = \"\") + \"g\")\n\n   /** Indicates whether the regular expression matches the entire [input]. */\n   public infix fun matches(input: CharSequence): Boolean {\n   nativePattern.reset()\n   val match = nativePattern.exec(input.toString())\n   return match != null && match.index == 0 && nativePattern.lastIndex == input.length\n   }\n\n   /** Indicates whether the regular expression can find at least one match in the specified [input]. */\n   public fun containsMatchIn(input: CharSequence): Boolean {\n   nativePattern.reset()\n   return nativePattern.test(input.toString())\n   }\n\n   /** Returns the first match of a regular expression in the [input], beginning at the specified [startIndex].\n   *\n   * @param startIndex An index to start search with, by default 0. Must be not less than zero and not greater than `input.length()`\n   * @return An instance of [MatchResult] if match was found or `null` otherwise.\n   */\n   public fun find(input: CharSequence, startIndex: Int = 0): MatchResult? = nativePattern.findNext(input.toString(), startIndex)\n\n   /** Returns a sequence of all occurrences of a regular expression within the [input] string, beginning at the specified [startIndex].\n   */\n   public fun findAll(input: CharSequence, startIndex: Int = 0): Sequence<MatchResult> = generateSequence({ find(input, startIndex) }, { match -> match.next() })\n\n   /**\n   * Attempts to match the entire [input] CharSequence against the pattern.\n   *\n   * @return An instance of [MatchResult] if the entire input matches or `null` otherwise.\n   */\n   public fun matchEntire(input: CharSequence): MatchResult? {\n   if (pattern.startsWith('^') && pattern.endsWith('$'))\n   return find(input)\n   else\n   return Regex(\"^${pattern.trimStart('^').trimEnd('$')}$\", options).find(input)\n   }\n\n   /**\n   * Replaces all occurrences of this regular expression in the specified [input] string with specified [replacement] expression.\n   *\n   * @param replacement A replacement expression that can include substitutions. See [https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/String/replace] for details.\n   */\n   public fun replace(input: CharSequence, replacement: String): String = input.toString().nativeReplace(nativePattern, replacement)\n\n   /**\n   * Replaces all occurrences of this regular expression in the specified [input] string with the result of\n   * the given function [transform] that takes [MatchResult] and returns a string to be used as a\n   * replacement for that match.\n   */\n   public inline fun replace(input: CharSequence, transform: (MatchResult) -> CharSequence): String {\n   var match = find(input)\n   if (match == null) return input.toString()\n\n   var lastStart = 0\n   val length = input.length\n   val sb = StringBuilder(length)\n   do {\n   val foundMatch = match!!\n   sb.append(input, lastStart, foundMatch.range.start)\n   sb.append(transform(foundMatch))\n   lastStart = foundMatch.range.endInclusive + 1\n   match = foundMatch.next()\n   }\n   while (lastStart < length && match != null)\n\n   if (lastStart < length) {\n   sb.append(input, lastStart, length)\n   }\n\n   return sb.toString()\n   }\n\n   /**\n   * Replaces the first occurrence of this regular expression in the specified [input] string with specified [replacement] expression.\n   *\n   * @param replacement A replacement expression that can include substitutions. See [Matcher.appendReplacement] for details.\n   */\n   public fun replaceFirst(input: CharSequence, replacement: String): String {\n   val nonGlobalOptions = options.map { it.value }.joinToString(separator = \"\")\n   return input.toString().nativeReplace(RegExp(pattern, nonGlobalOptions), replacement)\n   }\n\n   /**\n   * Splits this string around matches of the given regular expression.\n   *\n   * @param limit The maximum number of times the split can occur.\n   */\n   public fun split(input: CharSequence, limit: Int = 0): List<String> {\n   require(limit >= 0) { \"Limit must be non-negative, but was $limit\" }\n   val matches = findAll(input).let { if (limit == 0) it else it.take(limit - 1) }\n   val result = mutableListOf<String>()\n   var lastStart = 0\n\n   for (match in matches) {\n   result.add(input.subSequence(lastStart, match.range.start).toString())\n   lastStart = match.range.endInclusive + 1\n   }\n

result.add(input.subSequence(lastStart, input.length).toString())\n   return result\n }\n\n /** Returns the string representation of this regular expression. */\n   public override fun toString(): String = nativePattern.toString()\n\n companion object {\n   /** Returns a literal regex for the specified [literal] string. */   public fun fromLiteral(literal: String): Regex = Regex(escape(literal))\n\n   /** Returns a literal pattern for the specified [literal] string. */   public fun escape(literal: String): String = literal.nativeReplace(patternEscape, \"\\\\$&\")\n\n   /** Returns a literal replacement exression for the specified [literal] string. */   public fun escapeReplacement(literal: String): String = literal.nativeReplace(replacementEscape, \"$$$$\")\n\n   private val patternEscape = RegExp(\"\\\"\\\"[-\\\\\\^$*+?.()|[\\\\]{}]\\\"\\\"\\\", \"g\\\")\n   private val replacementEscape = RegExp(\"\\\"\\\"\\\\$\\\"\\\"\\\", \"g\\\")\n }\n}\n\n/** Creates a regular expression from the specified [pattern] string and the specified single [option]. */\n@Deprecated(\"Provided for binary compatibility\", level = DeprecationLevel.HIDDEN)\n@JsName(\"Regex_sb3q2\\\$\")\npublic fun Regex_0(pattern: String, option: RegexOption): Regex = Regex(pattern, setOf(option))\n\n/** Creates a regular expression from the specified [pattern] string and the default options. */\n@Deprecated(\"Provided for binary compatibility\", level = DeprecationLevel.HIDDEN)\n@JsName(\"Regex_61zpoe\\\$\")\npublic fun Regex_1(pattern: String): Regex = Regex(pattern, emptySet())\n\n\n\nprivate fun RegExp.findNext(input: String, from: Int): MatchResult? {\n   this.lastIndex = from\n   val match = exec(input)\n   if (match == null) return null\n   val range = match.index..lastIndex - 1\n\n   return object : MatchResult {\n   override val range: IntRange = range\n   override val value: String\n   get() = match[0]!!\n\n   override val groups: MatchGroupCollection = object : MatchGroupCollection, AbstractCollection<MatchGroup?>() {\n   override val size: Int get() = match.length\n   override fun iterator(): Iterator<MatchGroup?> = indices.asSequence().map { this[it] }.iterator()\n   override fun get(index: Int): MatchGroup? = match[index]?.let { MatchGroup(it) }\n   }\n\n\n   private var groupValues_: List<String>? = null\n\n   override val groupValues: List<String>\n   get() {\n   if (groupValues_ == null) {\n   groupValues_ = object : AbstractList<String>() {\n   override val size: Int get() = match.length\n   override fun get(index: Int): String = match[index] ?: \"\"\n   }\n   }\n   return groupValues_!!\n   }\n\n   override fun next(): MatchResult? = this@findNext.findNext(input, if (range.isEmpty()) range.start + 1 else range.endInclusive + 1)\n   }\n}\n","package kotlin.text\n\nimport kotlin.js.RegExp\n\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeIndexOf(ch: Char, fromIndex: Int): Int = nativeIndexOf(ch.toString(), fromIndex)\n@kotlin.internal.InlineOnly\ninternal inline fun String.nativeLastIndexOf(ch: Char, fromIndex: Int): Int = nativeLastIndexOf(ch.toString(), fromIndex)\n\n/**\n * Returns `true` if this string starts with the specified prefix.\n */\npublic fun String.startsWith(prefix: String, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase)\n   return nativeStartsWith(prefix, 0)\n   else\n   return regionMatches(0, prefix, 0, prefix.length, ignoreCase)\n}\n\n/**\n * Returns `true` if a substring of this string starting at the specified offset [startIndex] starts with the specified prefix.\n */\npublic fun String.startsWith(prefix: String, startIndex: Int, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase)\n   return nativeStartsWith(prefix, startIndex)\n   else\n   return regionMatches(startIndex, prefix, 0, prefix.length, ignoreCase)\n}\n\n/**\n * Returns `true` if this string ends with the specified suffix.\n */\npublic fun String.endsWith(suffix: String, ignoreCase: Boolean = false): Boolean {\n   if (!ignoreCase)\n   return nativeEndsWith(suffix)\n   else\n   return regionMatches(length - suffix.length, suffix, 0, suffix.length, ignoreCase)\n}\n\n\npublic fun String.matches(regex: String): Boolean {\n   val result = this.match(regex)\n   return result != null && result.size != 0\n}\n\npublic fun CharSequence.isBlank(): Boolean = length == 0 || (if (this is String) this else this.toString()).matches(\"^[\\\\s\\\\xA0]+$\")\n\npublic fun String?.equals(other: String?, ignoreCase: Boolean = false): Boolean =\n   if (this == null)\n   other == null\n   else if (!ignoreCase)\n   this == other\n   else\n   other != null && this.toLowerCase() == other.toLowerCase()\n\npublic fun CharSequence.regionMatches(thisOffset: Int, other: CharSequence, otherOffset: Int, length: Int, ignoreCase: Boolean = false): Boolean\n   = regionMatchesImpl(thisOffset, other, otherOffset, length, ignoreCase)\n\n/**\n * Returns a copy of this string capitalised if it is not empty or already starting with an uppper case letter, otherwise returns this\n *\n * @includeFunctionBody ../../test/StringTest.kt capitalize\n */\npublic fun String.capitalize(): String {\n   return if (isNotEmpty()) substring(0, 1).toUpperCase() + substring(1) else this\n}\n\n/**\n * Returns a

copy of this string with the first letter lower case if it is not empty or already starting with a lower case letter, otherwise returns this\n *\n * @includeFunctionBody ../../test/StringTest.kt decapitalize\n */\npublic fun String.decapitalize(): String {\n   return if (isNotEmpty()) substring(0, 1).toLowerCase() + substring(1) else this\n}\n\n/**\n * Returns a string containing this char sequence repeated [n] times.\n * @throws [IllegalArgumentException] when n < 0.\n */\npublic fun CharSequence.repeat(n: Int): String {\n   require(n >= 0) { \"Count 'n' must be non-negative, but was $n.\" }\n   return when (n) {\n   0 -> \"\"\n   1 -> this.toString()\n   else -> {\n   var result = \"\"\n   if (!isEmpty()) {\n   var s = this.toString()\n   var count = n\n   while (true) {\n   if ((count and 1) == 1) {\n   result += s\n   }\n   count = count ushr 1\n   if (count == 0) {\n   break\n   }\n   s += s\n   }\n   }\n   return result\n   }\n   }\n}\n\npublic fun String.replace(oldValue: String, newValue: String, ignoreCase: Boolean = false): String =\n   nativeReplace(RegExp(Regex.escape(oldValue), if (ignoreCase) \"gi\" else \"g\"), Regex.escapeReplacement(newValue))\n\npublic fun String.replace(oldChar: Char, newChar: Char, ignoreCase: Boolean = false): String =\n   nativeReplace(RegExp(Regex.escape(oldChar.toString()), if (ignoreCase) \"gi\" else \"g\"), newChar.toString())\n\npublic fun String.replaceFirst(oldValue: String, newValue: String, ignoreCase: Boolean = false): String =\n   nativeReplace(RegExp(Regex.escape(oldValue), if (ignoreCase) \"i\" else \"\"), Regex.escapeReplacement(newValue))\n\npublic fun String.replaceFirst(oldChar: Char, newChar: Char, ignoreCase: Boolean = false): String =\n   nativeReplace(RegExp(Regex.escape(oldChar.toString()), if (ignoreCase) \"i\" else \"\"), newChar.toString())\n","package kotlin.text\n\n/**\n * Defines names for Unicode symbols used in proper Typography.\n */\npublic object Typography {\n   /** The character " \u2013 quotation mark */\n   public const val quote: Char = '\\u0022'\n   /** The character $ \u2013 dollar sign */\n   public const val dollar: Char = '\\u0024'\n   /** The character & \u2013 ampersand */\n   public const val amp: Char = '\\u0026'\n   /** The character < \u2013 less-than sign */\n   public const val less: Char = '\\u003C'\n   /** The character > \u2013 greater-than sign */\n   public const val greater: Char = '\\u003E'\n   /** The non-breaking space character */\n   public const val nbsp: Char = '\\u00A0'\n   /** The character × */\n   public const val times: Char = '\\u00D7'\n   /** The character ¢ */\n   public const val cent: Char = '\\u00A2'\n   /** The character £ */\n   public const val pound: Char = '\\u00A3'\n   /** The character § */\n   public const val section: Char = '\\u00A7'\n   /** The character © */\n   public const val copyright: Char = '\\u00A9'\n   /** The character « */\n   public const val leftGuillemete: Char = '\\u00AB'\n   /** The character » */\n   public const val rightGuillemete: Char = '\\u00BB'\n   /** The character ® */\n   public const val registered: Char = '\\u00AE'\n   /** The character ° */\n   public const val degree: Char = '\\u00B0'\n   /** The character ± */\n   public const val plusMinus: Char = '\\u00B1'\n   /** The character ¶ */\n   public const val paragraph: Char = '\\u00B6'\n   /** The character · */\n   public const val middleDot: Char = '\\u00B7'\n   /** The character ½ */\n   public const val half: Char = '\\u00BD'\n   /** The character – */\n   public const val ndash: Char = '\\u2013'\n   /** The character — */\n   public const val mdash: Char = '\\u2014'\n   /** The character ‘ */\n   public const val leftSingleQuote: Char = '\\u2018'\n   /** The character ’ */\n   public const val rightSingleQuote: Char = '\\u2019'\n   /** The character ‚ */\n   public const val lowSingleQuote: Char = '\\u201A'\n   /** The character “ */\n   public const val leftDoubleQuote: Char = '\\u201C'\n   /** The character ” */\n   public const val rightDoubleQuote: Char = '\\u201D'\n   /** The character „ */\n   public const val lowDoubleQuote: Char = '\\u201E'\n   /** The character † */\n   public const val dagger: Char = '\\u2020'\n   /** The character ‡ */\n   public const val doubleDagger: Char = '\\u2021'\n   /** The character • */\n   public const val bullet: Char = '\\u2022'\n   /** The character … */\n   public const val ellipsis: Char = '\\u2026'\n   /** The character ′ */\n   public const val prime: Char = '\\u2032'\n   /** The character ″ */\n   public const val doublePrime: Char = '\\u2033'\n   /** The character € */\n   public const val euro: Char = '\\u20AC'\n   /** The character ™ */\n   public const val tm: Char = '\\u2122'\n   /** The character ≈ */\n   public const val almostEqual: Char = '\\u2248'\n   /** The character ≠ */\n   public const val notEqual: Char = '\\u2260'\n   /** The character ≤ */\n   public const val lessOrEqual: Char =

'\\u2264'\n   /** The character ≥ */\n   public const val greaterOrEqual: Char = '\\u2265'\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.text\n\n/**\n * Represents a collection of captured groups in a single match of a regular expression.\n *\n * This collection has size of `groupCount + 1` where `groupCount` is the count of groups in the regular expression.\n * Groups are indexed from 1 to `groupCount` and group with the index 0 corresponds to the entire match.\n *\n * An element of the collection at the particular index can be `null`,\n * if the corresponding group in the regular expression is optional and\n * there was no match captured by that group.\n */\npublic interface MatchGroupCollection : Collection<MatchGroup?> {\n\n   /** Returns a group with the specified [index].\n   *\n   * @return An instance of [MatchGroup] if the group with the specified [index] was matched or `null` otherwise.\n   *\n   * Groups are indexed from 1 to the count of groups in the regular expression. A group with the index 0\n   * corresponds to the entire match.\n   */\n   public operator fun get(index: Int): MatchGroup?\n}\n\n/**\n * Extends [MatchGroupCollection] by introducing a way to get matched groups by name, when regex supports it.\n */\n@SinceKotlin(\"1.1\")\npublic interface MatchNamedGroupCollection : MatchGroupCollection {\n   /**\n   * Returns a named group with the specified [name].\n   * @return An instance of [MatchGroup] if the group with the specified [name] was matched or `null` otherwise.\n   */\n   public operator fun get(name: String): MatchGroup?\n}\n\n/**\n * Represents the results from a single regular expression match.\n */\npublic interface MatchResult {\n   /** The range of indices in the original string where match was captured. */\n   public val range: IntRange\n   /** The substring from the input string captured by this match. */\n   public val value: String\n   /**\n   * A collection of groups matched by the regular expression.\n   *\n   * This collection has size of `groupCount + 1` where `groupCount` is the count of groups in the regular expression.\n   * Groups are indexed from 1 to `groupCount` and group with the index 0 corresponds to the entire match.\n   */\n   public val groups: MatchGroupCollection\n   /**\n   * A list of matched indexed group values.\n   *\n   * This list has size of `groupCount + 1` where `groupCount` is the count of groups in the regular expression.\n   * Groups are indexed from 1 to `groupCount` and group with the index 0 corresponds to the entire match.\n   *\n   * If the group in the regular expression is optional and there were no match captured by that group,\n   * corresponding item in [groupValues] is an empty string.\n   *\n   * @sample: samples.text.Regexps.matchDestructuringToGroupValues\n   */\n   public val groupValues: List<String>\n\n/**\n   * An instance of [MatchResult.Destructured] wrapper providing components for destructuring assignment of group values.\n   *\n   * component1 corresponds to the value of the first group, component2 \u2014 of the second, and so on.\n   *\n   * @sample: samples.text.Regexps.matchDestructuring\n   */\n   public val destructured: Destructured get() = Destructured(this)\n\n   /** Returns a new [MatchResult] with the results for the next match, starting at the position\n   * at which the last match ended (at the character after the last matched character).\n   */\n   public fun next(): MatchResult?\n\n   /**\n   * Provides components for destructuring assignment of group values.\n   *\n   * [component1] corresponds to the value of the first group, [component2] \u2014 of the second, and so on.\n   *\n   * If the group in the regular expression is optional and there were no match captured by that group,\n   * corresponding component value is an empty string.\n   *\n   * @sample: samples.text.Regexps.matchDestructuringToGroupValues\n   */\n   public class Destructured internal constructor(public val match: MatchResult) {\n   @kotlin.internal.InlineOnly\n   public operator inline fun component1(): String = match.groupValues[1]\n   @kotlin.internal.InlineOnly\n   public operator inline fun component2(): String = match.groupValues[2]\n   @kotlin.internal.InlineOnly\n   public operator inline fun component3(): String = match.groupValues[3]\n   @kotlin.internal.InlineOnly\n   public operator inline fun component4(): String = match.groupValues[4]\n   @kotlin.internal.InlineOnly\n   public operator inline fun component5(): String = match.groupValues[5]\n   @kotlin.internal.InlineOnly\n   public operator inline fun component6(): String = match.groupValues[6]\n   @kotlin.internal.InlineOnly\n   public operator inline fun

component7(): String = match.groupValues[7]\n   @kotlin.internal.InlineOnly\n   public operator inline fun

component8(): String = match.groupValues[8]\n   @kotlin.internal.InlineOnly\n   public operator inline fun

component9(): String = match.groupValues[9]\n   @kotlin.internal.InlineOnly\n   public operator inline fun

component10(): String = match.groupValues[10]\n   /**\n   * Returns destructured group values as a list of

strings.\n   * First value in the returned list corresponds to the value of the first group, and so on.\n   *\n

* @sample: samples.text.Regexps.matchDestructuringToGroupValues\n   */\n   public fun toList():

List<String> = match.groupValues.subList(1, match.groupValues.size)\n

}\n}","@file:kotlin.jvm.JvmMultifileClass\n@file:kotlin.jvm.JvmName(\"StringsKt\")\n\npackage

kotlin.text\n\n/**\n * Converts the string into a regular expression [Regex] with the default options.\n

*/\n@kotlin.internal.InlineOnly\npublic inline fun String.toRegex(): Regex = Regex(this)\n\n/**\n * Converts the

string into a regular expression [Regex] with the specified single [option].\n */\n@kotlin.internal.InlineOnly\npublic

inline fun String.toRegex(option: RegexOption): Regex = Regex(this, option)\n\n/**\n * Converts the string into a

regular expression [Regex] with the specified set of [options].\n */\n@kotlin.internal.InlineOnly\npublic inline fun

String.toRegex(options: Set<RegexOption>): Regex = Regex(this, options)\n\n/* Not available on platform: JS

*/\n\n\n\n\n\n\n","package kotlin\n\n/**\n * Represents a version of the Kotlin standard library.\n *\n * [major],

[minor] and [patch] are integer components of a version,\n * they must be non-negative and not greater than 255

([MAX_COMPONENT_VALUE]).\n *\n * @constructor Creates a version from all three components.\n

*/\n@SinceKotlin(\"1.1\")\npublic class KotlinVersion(val major: Int, val minor: Int, val patch: Int) :

Comparable<KotlinVersion> {\n   /**\n   * Creates a version from [major] and [minor] components, leaving

[patch] component zero.\n   */\n   public constructor(major: Int, minor: Int) : this(major, minor, 0)\n\n   private val

version = versionOf(major, minor, patch)\n\n   private fun versionOf(major: Int, minor: Int, patch: Int): Int {\n

require(major in 0..MAX_COMPONENT_VALUE && minor in 0..MAX_COMPONENT_VALUE && patch in

0..MAX_COMPONENT_VALUE) {\n   \"Version components are out of range: $major.$minor.$patch\"\n

}\n   return major.shl(16) + minor.shl(8) + patch\n   }\n\n   /**\n   * Returns the string representation of this

version\n   */\n   override fun toString(): String = \"$major.$minor.$patch\"\n\n   override fun equals(other:

Any?): Boolean {\n   if (this === other) return true\n   val otherVersion = (other as? KotlinVersion) ?: return

false\n   return this.version == otherVersion.version\n   }\n\n   override fun hashCode(): Int = version\n\n

override fun compareTo(other: KotlinVersion): Int = version - other.version\n\n   /**\n   * Returns `true` if this

version is not less than the version specified\n   * with the provided [major] and [minor] components.\n   */\n

public fun isAtLeast(major: Int, minor: Int): Boolean =\n   // or this.version >= versionOf(major, minor, 0)\n

this.major > major || (this.major == major &&\n   this.minor >= minor)\n\n   /**\n   * Returns `true`

if this version is not less than the version specified\n   * with the provided [major], [minor] and [patch]

components.\n   */\n   public fun isAtLeast(major: Int, minor: Int, patch: Int): Boolean =\n   // or this.version

>= versionOf(major, minor, patch)\n   this.major > major || (this.major == major &&\n   (this.minor

> minor || this.minor == minor &&\n   this.patch >= patch))\n\n   companion object {\n   /**\n

* Maximum value a version component can have, a constant value 255.\n   */\n   // NOTE: Must be placed

before CURRENT because its initialization requires this field being initialized in JS\n   public const val

MAX_COMPONENT_VALUE = 255\n\n   /**\n   * Returns the current version of the Kotlin standard

library.\n   */\n   @kotlin.jvm.JvmField\n   public val CURRENT: KotlinVersion = KotlinVersion(1, 2,

40) // value is written here automatically during build\n

}\n}\n","@file:kotlin.jvm.JvmName(\"LateinitKt\")\n@file:Suppress(\"unused\")\n\npackage kotlin\n\nimport

kotlin.internal.InlineOnly\nimport kotlin.internal.AccessibleLateinitPropertyLiteral\nimport

kotlin.reflect.KProperty0\n\n/**\n * Returns `true` if this lateinit property has been assigned a value, and `false`

otherwise.\n *\n * Cannot be used in an inline function, to avoid binary compatibility issues.\n

*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\ninline val @receiver:AccessibleLateinitPropertyLiteral

KProperty0<*>.isInitialized: Boolean\n   get() = throw NotImplementedError(\"Implementation is

intrinsic\")\n","@file:kotlin.jvm.JvmName(\"LazyKt\")\n\npackage kotlin\n\nimport

kotlin.reflect.KProperty\n\n/**\n * Represents a value with lazy initialization.\n *\n * To create an instance of

[Lazy] use the [lazy] function.\n */\npublic interface Lazy<out T> {\n   /**\n   * Gets the lazily initialized value of the current Lazy instance.\n   * Once the value was initialized it must not change during the rest of lifetime of this Lazy instance.\n   */\n   public val value: T\n   /**\n   * Returns `true` if a value for this Lazy instance has been already initialized, and `false` otherwise.\n   * Once this function has returned `true` it stays `true` for the rest of lifetime of this Lazy instance.\n   */\n   public fun isInitialized(): Boolean\n}\n\n/**\n * Creates a new instance of the [Lazy] that is already initialized with the specified [value].\n */\npublic fun <T> lazyOf(value: T): Lazy<T> = InitializedLazyImpl(value)\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n/**\n * An extension to delegate a read-only property of type [T] to an instance of [Lazy].\n *\n * This extension allows to use instances of Lazy for property delegation:\n * `val property: String by lazy { initializer }`\n */\n@kotlin.internal.InlineOnly\npublic inline operator fun <T> Lazy<T>.getValue(thisRef: Any?, property: KProperty<*>): T = value\n\n/**\n * Specifies how a [Lazy] instance synchronizes initialization among multiple threads.\n */\npublic enum class LazyThreadSafetyMode {\n\n   /**\n   * Locks are used to ensure that only a single thread can initialize the [Lazy] instance.\n   */\n   SYNCHRONIZED,\n\n   /**\n   * Initializer function can be called several times on concurrent access to uninitialized [Lazy] instance value,\n   * but only the first returned value will be used as the value of [Lazy] instance.\n   */\n   PUBLICATION,\n\n   /**\n   * No locks are used to synchronize an access to the [Lazy] instance value; if the instance is accessed from multiple threads, its behavior is undefined.\n   *\n   * This mode should not be used unless the [Lazy] instance is guaranteed never to be initialized from more than one thread.\n   */\n   NONE,\n}\n\n\nprivate object UNINITIALIZED_VALUE\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n// internal to be called from lazy in JS\ninternal class UnsafeLazyImpl<out T>(initializer: () -> T) : Lazy<T>, Serializable {\n   private var initializer: (() -> T)? = initializer\n   private var _value: Any? = UNINITIALIZED_VALUE\n\n   override val value: T\n   get() {\n   if (_value === UNINITIALIZED_VALUE) {\n   _value = initializer!!()\n   initializer = null\n   }\n   @Suppress(\"UNCHECKED_CAST\")\n   return _value as T\n   }\n\n   override fun isInitialized(): Boolean = _value !== UNINITIALIZED_VALUE\n\n   override fun toString(): String = if (isInitialized()) value.toString() else \"Lazy value not initialized yet.\"\n\n   private fun writeReplace(): Any = InitializedLazyImpl(value)\n}\n\nprivate class InitializedLazyImpl<out T>(override val value: T) : Lazy<T>, Serializable {\n\n   override fun isInitialized(): Boolean = true\n\n   override fun toString(): String = value.toString()\n}\n\n/* Not available on platform: JS */\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n\n","/*\n * Copyright 2000-2018 JetBrains s.r.o. Use of this source code is governed by the Apache 2.0 license\n * that can be found in the license/LICENSE.txt file.\n */\n\npackage kotlin\nimport kotlin.internal.RequireKotlin\nimport kotlin.internal.RequireKotlinVersionKind\n\n@kotlin.internal.InlineOnly\n@SinceKotlin(\"1.2\")\n@Suppress(\"INVISIBLE_MEMBER\", \"INVISIBLE_REFERENCE\")\n@RequireKotlin(\"1.2.30\", level = DeprecationLevel.HIDDEN, versionKind = RequireKotlinVersionKind.COMPILER_VERSION)\npublic inline fun <R> suspend(noinline block: suspend () -> R): suspend () -> R = block\n","@file:kotlin.jvm.JvmName(\"TuplesKt\")\npackage kotlin\n\n\n/**\n * Represents a generic pair of two values.\n *\n * There is no meaning attached to values in this class, it can be used for any purpose.\n * Pair exhibits value semantics, i.e. two pairs are equal if both components are equal.\n *\n * An example of decomposing it into values:\n * @sample samples.misc.Tuples.pairDestructuring\n *\n * @param A type of the first value.\n * @param B type of the second value.\n * @property first First value.\n * @property second Second value.\n * @constructor Creates a new instance of Pair.\n */\npublic data class Pair<out A, out B>(\n   public val first: A,\n   public val second: B\n   ) : Serializable {\n\n   /**\n   * Returns string representation of the [Pair] including its [first] and [second] values.\n   */\n   public override fun toString(): String = \"($first, $second)\"\n}\n\n/**\n * Creates a tuple of type [Pair] from this and [that].\n *\n * This can be useful for creating [Map] literals with less noise, for example:\n * @sample samples.collections.Maps.Instantiation.mapFromPairs\n */\npublic infix fun <A, B> A.to(that: B): Pair<A, B> = Pair(this, that)\n\n/**\n * Converts this pair into a list.\n

*/\npublic fun <T> Pair<T, T>.toList(): List<T> = listOf(first, second)\n\n/**\n * Represents a triad of values\n *\n * There is no meaning attached to values in this class, it can be used for any purpose.\n * Triple exhibits value semantics, i.e. two triples are equal if all three components are equal.\n * An example of decomposing it into values:\n * @sample samples.misc.Tuples.tripleDestructuring\n *\n * @param A type of the first value.\n * @param B type of the second value.\n * @param C type of the third value.\n * @property first First value.\n * @property second Second value.\n * @property third Third value.\n */\npublic data class Triple<out A, out B, out C>(\n   public val first: A,\n   public val second: B,\n   public val third: C\n   ) : Serializable {\n\n   /**\n   * Returns string representation of the [Triple] including its [first], [second] and [third] values.\n   */\n   public override fun toString(): String = \"($first, $second, $third)\"\n}\n\n/**\n * Converts this triple into a list.\n */\npublic fun <T> Triple<T, T, T>.toList(): List<T> = listOf(first, second, third)\n","@file:Suppress(\"DEPRECATION\")\npackage jquery.ui\n\n\n//jquery UI\nimport jquery.JQuery\nimport kotlin.js.Json\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.buttonset(): JQuery = asDynamic().buttonset()\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.dialog(): JQuery = asDynamic().dialog()\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.dialog(params: Json): JQuery = asDynamic().dialog(params)\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.dialog(mode: String, param: String): Any? = asDynamic().dialog(mode, param)\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.dialog(mode: String): JQuery = asDynamic().dialog(mode)\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.dialog(mode: String, param: String, value: Any?): JQuery = asDynamic().dialog(mode, param, value)\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.button(): JQuery = asDynamic().button()\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.accordion(): JQuery = asDynamic().accordion()\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.draggable(params: Json): JQuery = asDynamic().draggable(params)\n\n@Deprecated(\"JQuery is going to be removed from the standard library\")\npublic inline fun JQuery.selectable(): JQuery = asDynamic().selectable()\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.js\n\nimport kotlin.annotation.AnnotationTarget.*\n\n@Target(CLASS, FUNCTION, PROPERTY, CONSTRUCTOR, VALUE_PARAMETER, PROPERTY_GETTER, PROPERTY_SETTER)\n@Deprecated(\"Use `external` modifier instead\", level = DeprecationLevel.ERROR)\npublic annotation class native(public val name: String = \"\")\n\n@Target(FUNCTION)\n@Deprecated(\"Use inline extension function with body using dynamic\")\npublic annotation class nativeGetter\n\n@Target(FUNCTION)\n@Deprecated(\"Use inline extension function with body using dynamic\")\npublic annotation class nativeSetter\n\n@Target(FUNCTION)\n@Deprecated(\"Use inline extension function with body using dynamic\")\npublic annotation class nativeInvoke\n\n@Target(CLASS, FUNCTION, PROPERTY)\ninternal annotation class library(public val name: String = \"\")\n\n@Target(CLASS)\ninternal annotation class marker\n\n/**\n * Gives a declaration (a function, a property or a class) specific name in JavaScript.\n *\n * This may be useful in the following cases:\n *\n *   * There are two functions for which the compiler gives same name in JavaScript, you can\n *   mark one with `@JsName(...)` to prevent the compiler from reporting error.\n *   * You are writing a JavaScript library in Kotlin. The compiler produces mangled names\n *   for functions with parameters, which is unnatural for usual JavaScript developer.\n *   You can put `@JsName(...)` on functions you want to be available from JavaScript.\n *   * For some reason you want to rename declaration, e.g. there's common term in JavaScript\n *   for a concept provided by the declaration, which in uncommon in Kotlin.\n *\n *

Example:\n *\n * ``` kotlin\n * class Person(val name: String) {\n *   fun hello() {\n *   println(\"Hello $name!\")\n *   }\n *\n *   @JsName(\"helloWithGreeting\")\n *   fun hello(greeting: String) {\n *   println(\"$greeting $name!\")\n *   }\n * }\n * ```\n *\n * @property name the name which compiler uses both for declaration itself and for all references to the declaration.\n *   It's required to denote a valid JavaScript identifier.\n *\n * @since 1.1\n */\n@Retention(AnnotationRetention.BINARY)\n@Target(CLASS, FUNCTION, PROPERTY, CONSTRUCTOR, PROPERTY_GETTER, PROPERTY_SETTER)\nannotation class JsName(val name: String)\n\n/**\n * Denotes an `external` declaration that must be imported from native JavaScript library.\n *\n * The compiler produces the code relevant for the target module system, for example, in case of CommonJS,\n * it will import the declaration via the `require(...)` function.\n *\n * The annotation can be used on top-level external declarations (classes, properties, functions) and files.\n * In case of file (which can't be `external`) the following rule applies: all the declarations in\n * the file must be `external`. By applying `@JsModule(...)` on a file you tell the compiler to import a JavaScript object\n * that contain all the declarations from the file.\n *\n * Example:\n *\n * ``` kotlin\n * @JsModule(\"jquery\")\n * external abstract class JQuery() {\n *   // some declarations here\n * }\n *\n * @JsModule(\"jquery\")\n * external fun JQuery(element: Element): JQuery\n * ```\n *\n * @property import name of a module to import declaration from.\n *   It is not interpreted by the Kotlin compiler, it's passed as is directly to the target module system.\n *\n * @see JsNonModule\n * @since 1.1\n */\n@Retention(AnnotationRetention.BINARY)\n@Target(CLASS, PROPERTY, FUNCTION, FILE)\nannotation class JsModule(val import: String)\n\n/**\n * Denotes an `external` declaration that can be used without module system.\n *\n * By default, an `external` declaration is available regardless your target module system.\n * However, by applying [JsModule] annotation you can make a declaration unavailable to *plain* module system.\n * Some JavaScript libraries are distributed both as a standalone downloadable piece of JavaScript and as a module available\n * as an npm package.\n * To tell the Kotlin compiler to accept both cases, you can augment [JsModule]\n * with the `@JsNonModule` annotation.\n *\n * For example:\n *\n * ``` kotlin\n * @JsModule(\"jquery\")\n * @JsNonModule\n * @JsName(\"$\")\n * external abstract class JQuery() {\n *   // some declarations here\n * }\n *\n * @JsModule(\"jquery\")\n * @JsNonModule\n * @JsName(\"$\")\n * external fun JQuery(element: Element): JQuery\n * ```\n *\n * @see JsModule\n * @since 1.1\n */\n@Retention(AnnotationRetention.BINARY)\n@Target(CLASS, PROPERTY, FUNCTION, FILE)\nannotation class JsNonModule\n\n/**\n * Adds prefix to `external` declarations in a source file.\n *\n * JavaScript does not have concept of packages (namespaces). They are usually emulated by nested objects.\n * The compiler turns references to `external` declarations either to plain unprefixed names (in case of *plain* modules)\n * or to plain imports.\n * However, if a JavaScript library provides its declarations in packages, you won't be satisfied with this.\n * You can tell the compiler to generate additional prefix before references to `external` declarations using the\n * `@JsQuafier(...)`\n * annotation.\n *\n * Note that a file marked with the `@JsQulifier(...)` annotation can't contain non-`external` declarations.\n *\n * Example:\n *\n * ```\n * @file:JsQualifier(\"my.jsPackageName\")\n * package some.kotlinPackage\n *\n * external fun foo(x: Int)\n *\n * external fun bar(): String\n * ```\n *\n * @property value the qualifier to add to the declarations in the generated code.\n *   It must be a sequence of valid JavaScript identifiers separated by the `.` character.\n *   Examples of valid qualifiers are: `foo`, `bar.Baz`, `_.$0.f`.\n *\n * @see JsModule\n * @since 1.1\n */\n@Retention(AnnotationRetention.BINARY)\n@Target(AnnotationTarget.FILE)\nannotation class JsQualifier(val value: String)","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.jvm\n\n\n// these are used in common generated code in stdlib\n\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.CONSTRUCTOR)\n@Retention(AnnotationRetention.SOURCE)\ninternal annotation class JvmOverloads\n\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY_GETTER,

AnnotationTarget.PROPERTY_SETTER,
AnnotationTarget.FILE)\n@Retention(AnnotationRetention.SOURCE)\n@MustBeDocumented\ninternal
annotation class JvmName(public val name:
String)\n\n@Target(AnnotationTarget.FILE)\n@Retention(AnnotationRetention.SOURCE)\n@MustBeDocumente
d\ninternal annotation class
JvmMultifileClass\n\n@Target(AnnotationTarget.FIELD)\n@Retention(AnnotationRetention.SOURCE)\n@MustB
eDocumented\ninternal annotation class
JvmField\n\n\n@Target(AnnotationTarget.FIELD)\n@Retention(AnnotationRetention.SOURCE)\npublic
annotation class Volatile\n\n@Target(AnnotationTarget.FUNCTION, AnnotationTarget.PROPERTY_GETTER,
AnnotationTarget.PROPERTY_SETTER)\n@Retention(AnnotationRetention.SOURCE)\npublic annotation class
Synchronized\n","package kotlin.js\n\n@Deprecated(message = \"Use `definedExternally` instead\", level =
DeprecationLevel.ERROR, replaceWith = ReplaceWith(\"definedExternally\"))\npublic external val noImpl:
Nothing\n\n/**\n * The property that can be used as a placeholder for statements and values that are defined in
JavaScript.\n *\n * This property can be used in two cases:\n *\n * To represent body of an external function. In
most cases Kotlin does not require to provide bodies of external\n *   functions and properties, but if for some
reason you want to (for example, due to limitation of your coding style guides),\n *   you should use
`definedExternally`.\n * * To represent value of default argument.\n *\n * There's two forms of using
`definedExternally`:\n *\n * 1. `= definedExternally` (for functions, properties and parameters).\n * 2. `{
definedExternally }` (for functions and property getters/setters).\n *\n * This property can't be used from normal
code.\n *\n * Examples:\n *\n * ``` kotlin\n * external fun foo(): String = definedExternally\n * external fun bar(x:
Int) { definedExternally }\n * external fun baz(z: Any = definedExternally): Array<Any>\n * external val prop:
Float = definedExternally\n * ```\n */\npublic external val definedExternally: Nothing\n\n/**\n * Exposes the
JavaScript [eval function](https://developer.mozilla.org/en-
US/docs/Web/JavaScript/Reference/Global_Objects/eval) to Kotlin.\n */\npublic external fun eval(expr: String):
dynamic\n\n/**\n * Exposes the JavaScript [undefined property](https://developer.mozilla.org/en-
US/docs/Web/JavaScript/Reference/Global_Objects/undefined) to Kotlin.\n */\npublic external val undefined:
Nothing?\n\n@Deprecated(\"Use toInt() instead.\", ReplaceWith(\"s.toInt()\"), level =
DeprecationLevel.ERROR)\npublic external fun parseInt(s: String): Int\n\n@Deprecated(\"Use toInt(radix)
instead.\", ReplaceWith(\"s.toInt(radix)\"), level = DeprecationLevel.ERROR)\npublic external fun parseInt(s:
String, radix: Int = definedExternally): Int\n\n@Deprecated(\"Use toDouble() instead.\",
ReplaceWith(\"s.toDouble()\"), level = DeprecationLevel.ERROR)\npublic external fun parseFloat(s: String, radix:
Int = definedExternally): Double\n\n/**\n * Puts the given piece of a JavaScript code right into the calling
function.\n * The compiler replaces call to `js(...)` code with the string constant provided as a parameter.\n *\n *
Example:\n *\n * ``` kotlin\n * fun logToConsole(message: String): Unit {\n *   js(\"console.log(message)\")\n *
}\n * ```\n *\n * @param code the piece of JavaScript code to put to the generated code.\n *   Must be a compile-
time constant, otherwise compiler produces error message.\n *   You can safely refer to local variables of calling
function (but not to local variables of outer functions),\n *   including parameters. You can't refer to functions,
properties and classes by their short names.\n */\npublic external fun js(code: String): dynamic\n\n/**\n * Function
corresponding to JavaScript's `typeof` operator\n
*/\n@kotlin.internal.InlineOnly\n@Suppress(\"UNUSED_PARAMETER\")\npublic inline fun jsTypeOf(a: Any?):
String = js(\"typeof a\")\n\n@kotlin.internal.InlineOnly\n@Suppress(\"UNUSED_PARAMETER\")\ninternal inline
fun deleteProperty(obj: Any, property: Any) {\n   js(\"delete obj[property]\")\n}","/*\n * Copyright 2010-2016
JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this
file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n *
http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing,
software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES
OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language
governing permissions and\n * limitations under the License.\n */\n\n@file:Suppress(\"UNUSED_PARAMETER\",

\"NOTHING_TO_INLINE\")\n\npackage kotlin\n\n/**\n * Returns an empty array of the specified type [T].\n */\npublic inline fun <T> emptyArray(): Array<T> = js(\"[]\")\n\n@library\npublic fun <T> arrayOf(vararg elements: T): Array<T> = definedExternally\n\n@library\npublic fun doubleArrayOf(vararg elements: Double): DoubleArray = definedExternally\n\n@library\npublic fun floatArrayOf(vararg elements: Float): FloatArray = definedExternally\n\n@library\npublic fun longArrayOf(vararg elements: Long): LongArray = definedExternally\n\n@library\npublic fun intArrayOf(vararg elements: Int): IntArray = definedExternally\n\n@library\npublic fun charArrayOf(vararg elements: Char): CharArray = definedExternally\n\n@library\npublic fun shortArrayOf(vararg elements: Short): ShortArray = definedExternally\n\n@library\npublic fun byteArrayOf(vararg elements: Byte): ByteArray = definedExternally\n\n@library\npublic fun booleanArrayOf(vararg elements: Boolean): BooleanArray = definedExternally\n\n/**\n * Creates a new instance of the [Lazy] that uses the specified initialization function [initializer].\n */\npublic fun <T> lazy(initializer: () -> T): Lazy<T> = UnsafeLazyImpl(initializer)\n\n/**\n * Creates a new instance of the [Lazy] that uses the specified initialization function [initializer].\n *\n * The [mode] parameter is ignored. */\npublic fun <T> lazy(mode: LazyThreadSafetyMode, initializer: () -> T): Lazy<T> = UnsafeLazyImpl(initializer)\n\n/**\n * Creates a new instance of the [Lazy] that uses the specified initialization function [initializer].\n *\n * The [lock] parameter is ignored.\n */\npublic fun <T> lazy(lock: Any?, initializer: () -> T): Lazy<T> = UnsafeLazyImpl(initializer)\n\ninternal fun fillFrom(src: dynamic, dst: dynamic): dynamic {\n   val srcLen: Int = src.length\n   val dstLen: Int = dst.length\n   var index: Int = 0\n   while (index < srcLen && index < dstLen) dst[index] = src[index++]\n   return dst\n}\n\ninternal fun arrayCopyResize(source: dynamic, newSize: Int, defaultValue: Any?): dynamic {\n   val result = source.slice(0, newSize)\n   copyArrayType(source, result)\n   var index: Int = source.length\n   if (newSize > index) {\n   result.length = newSize\n   while (index < newSize) result[index++] = defaultValue\n   }\n   return result\n}\n\ninternal fun <T> arrayPlusCollection(array: dynamic, collection: Collection<T>): dynamic {\n   val result = array.slice()\n   result.length += collection.size\n   copyArrayType(array, result)\n   var index: Int = array.length\n   for (element in collection) result[index++] = element\n   return result\n}\n\ninternal fun <T> fillFromCollection(dst: dynamic, startIndex: Int, collection: Collection<T>): dynamic {\n   var index = startIndex\n   for (element in collection) dst[index++] = element\n   return dst\n}\n\ninternal inline fun copyArrayType(from: dynamic, to: dynamic) {\n   if (from.`$type$` !== undefined) {\n   to.`$type$` = from.`$type$`\n   }\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n@file:Suppress(\"DEPRECATION\")\npackage kotlin.math\n\nimport kotlin.internal.InlineOnly\nimport kotlin.js.Math as nativeMath\n\n// constants, can't use them from nativeMath as they are not constants there\n\n/** Ratio of the circumference of a circle to its diameter, approximately 3.14159. */\n@SinceKotlin(\"1.2\")\npublic const val PI: Double = 3.141592653589793\n/** Base of the natural logarithms, approximately 2.71828. */\n@SinceKotlin(\"1.2\")\npublic const val E: Double = 2.718281828459045\n\n// ================ Double Math ================\n\n/**\n * Computes the sine of the angle [x] given in radians.\n *\n * Special cases:\n *   - `sin(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sin(x: Double): Double = nativeMath.sin(x)\n\n/**\n Computes the cosine of the angle [x] given in radians.\n *\n * Special cases:\n *   - `cos(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun cos(x: Double): Double = nativeMath.cos(x)\n\n/**\n Computes the tangent of the angle [x] given in radians.\n *\n * Special cases:\n *   - `tan(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun tan(x: Double): Double = nativeMath.tan(x)\n\n/**\n * Computes the arc sine of the value [x];\n * the returned value is an angle in the range from `-PI/2` to `PI/2` radians.\n *\n * Special cases:\n *   - `asin(x)` is `NaN`, when `abs(x) > 1` or x is `NaN`\n

*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun asin(x: Double): Double = nativeMath.asin(x)\n\n/**\n * Computes the arc cosine of the value [x];\n * the returned value is an angle in the range from `0.0` to `PI` radians.\n *\n * Special cases:\n *   - `acos(x)` is `NaN`, when `abs(x) > 1` or x is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun acos(x: Double): Double = nativeMath.acos(x)\n\n/**\n * Computes the arc tangent of the value [x];\n * the returned value is an angle in the range from `-PI/2` to `PI/2` radians.\n *\n * Special cases:\n *   - `atan(NaN)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atan(x: Double): Double = nativeMath.atan(x)\n\n/**\n * Returns the angle `theta` of the polar coordinates `(r, theta)` that correspond\n * to the rectangular coordinates `(x, y)` by computing the arc tangent of the value [y] / [x];\n * the returned value is an angle in the range from `-PI` to `PI` radians.\n *\n * Special cases:\n *   - `atan2(0.0, 0.0)` is `0.0`\n *   - `atan2(0.0, x)` is `0.0` for `x > 0` and `PI` for `x < 0`\n *   - `atan2(-0.0, x)` is `-0.0` for 'x > 0` and `-PI` for `x < 0`\n *   - `atan2(y, +Inf)` is `0.0` for `0 < y < +Inf` and `-0.0` for '-Inf < y < 0`\n *   - `atan2(y, -Inf)` is `PI` for `0 < y < +Inf` and `-PI` for `-Inf < y < 0`\n *   - `atan2(y, 0.0)` is `PI/2` for `y > 0` and `-PI/2` for `y < 0`\n *   - `atan2(+Inf, x)` is `PI/2` for finite `x`y\n *   - `atan2(-Inf, x)` is `-PI/2` for finite `x`\n *   - `atan2(NaN, x)` and `atan2(y, NaN)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atan2(y: Double, x: Double): Double = nativeMath.atan2(y, x)\n\n/**\n * Computes the hyperbolic sine of the value [x].\n *\n * Special cases:\n *   - `sinh(NaN)` is `NaN`\n *   - `sinh(+Inf)` is `+Inf`\n *   - `sinh(-Inf)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sinh(x: Double): Double = nativeMath.sinh(x)\n\n/**\n * Computes the hyperbolic cosine of the value [x].\n *\n * Special cases:\n *   - `cosh(NaN)` is `NaN`\n *   - `cosh(+Inf|-Inf)` is `+Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun cosh(x: Double): Double = nativeMath.cosh(x)\n\n/**\n * Computes the hyperbolic tangent of the value [x].\n *\n * Special cases:\n *   - `tanh(NaN)` is `NaN`\n *   - `tanh(+Inf)` is `1.0`\n *   - `tanh(-Inf)` is `-1.0`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun tanh(x: Double): Double = nativeMath.tanh(x)\n\n/**\n * Computes the inverse hyperbolic sine of the value [x].\n *\n * The returned value is `y` such that `sinh(y) == x`.\n *\n * Special cases:\n *   - `asinh(NaN)` is `NaN`\n *   - `asinh(+Inf)` is `+Inf`\n *   - `asinh(-Inf)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun asinh(x: Double): Double = nativeMath.asinh(x)\n\n/**\n * Computes the inverse hyperbolic cosine of the value [x].\n *\n * The returned value is positive `y` such that `cosh(y) == x`.\n *\n * Special cases:\n *   - `acosh(NaN)` is `NaN`\n *   - `acosh(x)` is `NaN` when `x < 1`\n *   - `acosh(+Inf)` is `+Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun acosh(x: Double): Double = nativeMath.acosh(x)\n\n/**\n * Computes the inverse hyperbolic tangent of the value [x].\n *\n * The returned value is `y` such that `tanh(y) == x`.\n *\n * Special cases:\n *   - `tanh(NaN)` is `NaN`\n *   - `tanh(x)` is `NaN` when `x > 1` or `x < -1`\n *   - `tanh(1.0)` is `+Inf`\n *   - `tanh(-1.0)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atanh(x: Double): Double = nativeMath.atanh(x)\n\n/**\n * Computes `sqrt(x^2 + y^2)` without intermediate overflow or underflow.\n *\n * Special cases:\n *   - returns `+Inf` if any of arguments is infinite\n *   - returns `NaN` if any of arguments is `NaN` and the other is not infinite\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun hypot(x: Double, y: Double): Double = nativeMath.hypot(x, y)\n\n/**\n * Computes the positive square root of the value [x].\n *\n * Special cases:\n *   - `sqrt(x)` is `NaN` when `x < 0` or `x` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sqrt(x: Double): Double = nativeMath.sqrt(x)\n\n/**\n * Computes Euler's number `e` raised to the power of the value [x].\n *\n * Special cases:\n *   - `exp(NaN)` is `NaN`\n *   - `exp(+Inf)` is `+Inf`\n *   - `exp(-Inf)` is `0.0`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun exp(x: Double): Double = nativeMath.exp(x)\n\n/**\n * Computes `exp(x) - 1`.\n *\n * This function can be implemented to produce more precise result for [x] near zero.\n *\n * Special cases:\n *   - `expm1(NaN)` is `NaN`\n *   - `expm1(+Inf)` is `+Inf`\n *   - `expm1(-Inf)` is `-1.0`\n *\n * @see [exp] function.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun expm1(x: Double): Double = nativeMath.expm1(x)\n\n/**\n * Computes the logarithm of the value [x] to the given [base].\n *\n * Special cases:\n *   - `log(x, b)` is `NaN` if either `x` or `b` are `NaN`\n *   - `log(x, b)` is `NaN` when `x < 0` or `b <= 0` or `b == 1.0`\n *   - `log(+Inf, +Inf)` is `NaN`\n *   - `log(+Inf, b)` is `+Inf` for `b > 1` and `-Inf` for `b < 1`\n *   - `log(0.0, b)` is `-Inf` for `b > 1` and `+Inf` for `b > 1`\n *\n * See also logarithm functions for common fixed bases:

[ln], [log10] and [log2].\n */\n@SinceKotlin(\"1.2\")\npublic fun log(x: Double, base: Double): Double {\n   if (base <= 0.0 || base == 1.0) return Double.NaN\n   return nativeMath.log(x) / nativeMath.log(base)\n}\n\n/**\n * Computes the natural logarithm (base `E`) of the value [x].\n *\n * Special cases:\n * - `ln(NaN)` is `NaN`\n * - `ln(x)` is `NaN` when `x < 0.0`\n * - `ln(+Inf)` is `+Inf`\n * - `ln(0.0)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ln(x: Double): Double = nativeMath.log(x)\n\n/**\n * Computes the common logarithm (base 10) of the value [x].\n *\n * @see [ln] function for special cases.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun log10(x: Double): Double = nativeMath.log10(x)\n\n/**\n * Computes the binary logarithm (base 2) of the value [x].\n *\n * @see [ln] function for special cases.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun log2(x: Double): Double = nativeMath.log2(x)\n\n/**\n * Computes `ln(x + 1)`.\n *\n * This function can be implemented to produce more precise result for [x] near zero.\n *\n * Special cases:\n * - `ln1p(NaN)` is `NaN`\n * - `ln1p(x)` is `NaN` where `x < -1.0`\n * - `ln1p(-1.0)` is `-Inf`\n * - `ln1p(+Inf)` is `+Inf`\n *\n * @see [ln] function\n * @see [expm1] function\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ln1p(x: Double): Double = nativeMath.log1p(x)\n\n/**\n * Rounds the given value [x] to an integer towards positive infinity.\n\n * @return the smallest double value that is greater than the given value [x] and is a mathematical integer.\n *\n * Special cases:\n * - `ceil(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ceil(x: Double): Double = nativeMath.ceil(x).unsafeCast<Double>() // TODO: Remove unsafe cast after removing public js.math\n\n/**\n * Rounds the given value [x] to an integer towards negative infinity.\n\n * @return the largest double value that is smaller than the given value [x] and is a mathematical integer.\n *\n * Special cases:\n * - `floor(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun floor(x: Double): Double = nativeMath.floor(x).unsafeCast<Double>()\n\n/**\n * Rounds the given value [x] to an integer towards zero.\n *\n * @return the value [x] having its fractional part truncated.\n *\n * Special cases:\n * - `truncate(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun truncate(x: Double): Double = nativeMath.trunc(x)\n\n/**\n * Rounds the given value [x] towards the closest integer with ties rounded towards even integer.\n *\n * Special cases:\n * - `round(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\npublic fun round(x: Double): Double {\n   if (x % 0.5 != 0.0) {\n   return nativeMath.round(x).unsafeCast<Double>()\n   }\n   val floor = floor(x)\n   return if (floor % 2 == 0.0) floor else ceil(x)\n}\n\n/**\n * Returns the absolute value of the given value [x].\n *\n * Special cases:\n * - `abs(NaN)` is `NaN`\n *\n * @see absoluteValue extension property for [Double]\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun abs(x: Double): Double = nativeMath.abs(x)\n\n/**\n * Returns the sign of the given value [x]:\n * - `-1.0` if the value is negative,\n * - zero if the value is zero,\n * - `1.0` if the value is positive\n *\n * Special case:\n * - `sign(NaN)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sign(x: Double): Double = nativeMath.sign(x)\n\n/**\n * Returns the smaller of two values.\n *\n * If either value is `NaN`, then the result is `NaN`.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun min(a: Double, b: Double): Double = nativeMath.min(a, b)\n\n/**\n * Returns the greater of two values.\n *\n * If either value is `NaN`, then the result is `NaN`.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun max(a: Double, b: Double): Double = nativeMath.max(a, b)\n\n// extensions\n\n/**\n * Raises this value to the power [x].\n *\n * Special cases:\n * - `b.pow(0.0)` is `1.0`\n * - `b.pow(1.0) == b`\n * - `b.pow(NaN)` is `NaN`\n * - `NaN.pow(x)` is `NaN` for `x != 0.0`\n * - `b.pow(Inf)` is `NaN` for `abs(b) == 1.0`\n * - `b.pow(x)` is `NaN` for `b < 0` and `x` is finite and not an integer\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Double.pow(x: Double): Double = nativeMath.pow(this, x)\n\n/**\n * Raises this value to the integer power [n].\n *\n * See the other overload of [pow] for details.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Double.pow(n: Int): Double = nativeMath.pow(this, n.toDouble())\n\n/**\n * Returns the absolute value of this value.\n *\n * Special cases:\n * - `NaN.absoluteValue` is `NaN`\n *\n * @see abs function\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Double.absoluteValue: Double get() = nativeMath.abs(this)\n\n/**\n * Returns the sign of this value:\n * - `-

1.0` if the value is negative,\n * - zero if the value is zero,\n * - `1.0` if the value is positive\n *\n * Special case:\n * - `NaN.sign` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Double.sign: Double get() = nativeMath.sign(this)\n\n/**\n * Returns this value with the sign bit same as of the [sign] value.\n *\n * If [sign] is `NaN` the sign of the result is undefined.\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.withSign(sign: Double): Double {\n   val thisSignBit = js(\"Kotlin\").doubleSignBit(this).unsafeCast<Int>()\n   val newSignBit = js(\"Kotlin\").doubleSignBit(sign).unsafeCast<Int>()\n   return if (thisSignBit == newSignBit) this else -this\n}\n\n/**\n * Returns this value with the sign bit same as of the [sign] value.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Double.withSign(sign: Int): Double = this.withSign(sign.toDouble())\n\n/**\n * Returns the ulp (unit in the last place) of this value.\n *\n * An ulp is a positive distance between this value and the next nearest [Double] value larger in magnitude.\n *\n * Special Cases:\n * - `NaN.ulp` is `NaN`\n * - `x.ulp` is `+Inf` when `x` is `+Inf` or `-Inf`\n * - `0.0.ulp` is `Double.MIN_VALUE`\n */\n@SinceKotlin(\"1.2\")\npublic val Double.ulp: Double get() = when {\n   this < 0 -> (-this).ulp\n   this.isNaN() || this == Double.POSITIVE_INFINITY -> this\n   this == Double.MAX_VALUE -> this - this.nextDown()\n   else -> this.nextUp() - this\n}\n\n/**\n * Returns the [Double] value nearest to this value in direction of positive infinity.\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.nextUp(): Double = when {\n   this.isNaN() || this == Double.POSITIVE_INFINITY -> this\n   this == 0.0 -> Double.MIN_VALUE\n   else -> Double.fromBits(this.toRawBits() + if (this > 0) 1 else -1)\n}\n\n/**\n * Returns the [Double] value nearest to this value in direction of negative infinity.\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.nextDown(): Double = when {\n   this.isNaN() || this == Double.NEGATIVE_INFINITY -> this\n   this == 0.0 -> -Double.MIN_VALUE\n   else -> Double.fromBits(this.toRawBits() + if (this > 0) -1 else 1)\n}\n\n/**\n * Returns the [Double] value nearest to this value in direction from this value towards the value [to].\n *\n * Special cases:\n * - `x.nextTowards(y)` is `NaN` if either `x` or `y` are `NaN`\n * - `x.nextTowards(x) == x`\n *\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.nextTowards(to: Double): Double = when {\n   this.isNaN() || to.isNaN() -> Double.NaN\n   to == this -> to\n   to > this -> this.nextUp()\n   else /* to < this */-> this.nextDown()\n}\n\n/**\n * Rounds this [Double] value to the nearest integer and converts the result to [Int].\n * Ties are rounded towards positive infinity.\n *\n * Special cases:\n * - `x.roundToInt() == Int.MAX_VALUE` when `x > Int.MAX_VALUE`\n * - `x.roundToInt() == Int.MIN_VALUE` when `x < Int.MIN_VALUE`\n *\n * @throws IllegalArgumentException when this value is `NaN`\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.roundToInt(): Int = when {\n   isNaN() -> throw IllegalArgumentException(\"Cannot round NaN value.\")\n   this > Int.MAX_VALUE -> Int.MAX_VALUE\n   this < Int.MIN_VALUE -> Int.MIN_VALUE\n   else -> nativeMath.round(this).unsafeCast<Double>().toInt()\n}\n\n/**\n * Rounds this [Double] value to the nearest integer and converts the result to [Long].\n * Ties are rounded towards positive infinity.\n *\n * Special cases:\n * - `x.roundToLong() == Long.MAX_VALUE` when `x > Long.MAX_VALUE`\n * - `x.roundToLong() == Long.MIN_VALUE` when `x < Long.MIN_VALUE`\n *\n * @throws IllegalArgumentException when this value is `NaN`\n */\n@SinceKotlin(\"1.2\")\npublic fun Double.roundToLong(): Long = when {\n   isNaN() -> throw IllegalArgumentException(\"Cannot round NaN value.\")\n   this > Long.MAX_VALUE -> Long.MAX_VALUE\n   this < Long.MIN_VALUE -> Long.MIN_VALUE\n   else -> nativeMath.round(this).unsafeCast<Double>().toLong()\n}\n\n\n\n// ================ Float Math ==\n\n/** Computes the sine of the angle [x] given in radians.\n *\n * Special cases:\n * - `sin(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sin(x: Float): Float = nativeMath.sin(x.toDouble()).toFloat()\n\n/** Computes the cosine of the angle [x] given in radians.\n *\n * Special cases:\n * - `cos(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun cos(x: Float): Float = nativeMath.cos(x.toDouble()).toFloat()\n\n/** Computes the tangent of the angle [x] given in radians.\n *\n * Special cases:\n * - `tan(NaN|+Inf|-Inf)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun tan(x: Float): Float = nativeMath.tan(x.toDouble()).toFloat()\n\n/**\n * Computes the arc sine of the value [x];\n * the returned value is an angle in the range from `-PI/2` to `PI/2` radians.\n *\n * Special cases:\n * - `asin(x)` is `NaN`, when `abs(x) >

1` or x is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun asin(x: Float): Float =
nativeMath.asin(x.toDouble()).toFloat()\n\n/**\n * Computes the arc cosine of the value [x];\n * the returned value
is an angle in the range from `0.0` to `PI` radians.\n *\n * Special cases:\n *   - `acos(x)` is `NaN`, when `abs(x) >
1` or x is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun acos(x: Float): Float =
nativeMath.acos(x.toDouble()).toFloat()\n\n/**\n * Computes the arc tangent of the value [x];\n * the returned value
is an angle in the range from `-PI/2` to `PI/2` radians.\n *\n * Special cases:\n *   - `atan(NaN)` is `NaN`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atan(x: Float): Float =
nativeMath.atan(x.toDouble()).toFloat()\n\n/**\n * Returns the angle `theta` of the polar coordinates `(r, theta)` that
correspond\n * to the rectangular coordinates `(x, y)` by computing the arc tangent of the value [y] / [x];\n * the
returned value is an angle in the range from `-PI` to `PI` radians.\n *\n * Special cases:\n *   - `atan2(0.0, 0.0)` is
`0.0`\n *   - `atan2(0.0, x)` is `0.0` for `x > 0` and `PI` for `x < 0`\n *   - `atan2(-0.0, x)` is `-0.0` for 'x > 0` and `-PI`
for `x < 0`\n *   - `atan2(y, +Inf)` is `0.0` for `0 < y < +Inf` and `-0.0` for '-Inf < y < 0`\n *    - `atan2(y, -Inf)` is `PI`
for `0 < y < +Inf` and `-PI` for `-Inf < y < 0`\n *   - `atan2(y, 0.0)` is `PI/2` for `y > 0` and `-PI/2` for `y < 0`\n *   -
`atan2(+Inf, x)` is `PI/2` for finite `x`y\n *   - `atan2(-Inf, x)` is `-PI/2` for finite `x`\n *   - `atan2(NaN, x)` and
`atan2(y, NaN)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atan2(y: Float, x: Float):
Float = nativeMath.atan2(y.toDouble(), x.toDouble()).toFloat()\n\n/**\n * Computes the hyperbolic sine of the value
[x].\n *\n * Special cases:\n *   - `sinh(NaN)` is `NaN`\n *   - `sinh(+Inf)` is `+Inf`\n *   - `sinh(-Inf)` is `-Inf`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sinh(x: Float): Float =
nativeMath.sinh(x.toDouble()).toFloat()\n\n/**\n * Computes the hyperbolic cosine of the value [x].\n *\n * Special
cases:\n *   - `cosh(NaN)` is `NaN`\n *   - `cosh(+Inf|-Inf)` is `+Inf`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun cosh(x: Float): Float =
nativeMath.cosh(x.toDouble()).toFloat()\n\n/**\n * Computes the hyperbolic tangent of the value [x].\n *\n *
Special cases:\n *   - `tanh(NaN)` is `NaN`\n *   - `tanh(+Inf)` is `1.0`\n *   - `tanh(-Inf)` is `-1.0`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun tanh(x: Float): Float =
nativeMath.tanh(x.toDouble()).toFloat()\n\n/**\n * Computes the inverse hyperbolic sine of the value [x].\n *\n *
The returned value is `y` such that `sinh(y) == x`.\n *\n * Special cases:\n *   - `asinh(NaN)` is `NaN`\n *   -
`asinh(+Inf)` is `+Inf`\n *   - `asinh(-Inf)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun
asinh(x: Float): Float = nativeMath.asinh(x.toDouble()).toFloat()\n\n/**\n * Computes the inverse hyperbolic cosine
of the value [x].\n *\n * The returned value is positive `y` such that `cosh(y) == x`.\n *\n * Special cases:\n *   -
`acosh(NaN)` is `NaN`\n *   - `acosh(x)` is `NaN` when `x < 1`\n *   - `acosh(+Inf)` is `+Inf`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun acosh(x: Float): Float =
nativeMath.acosh(x.toDouble()).toFloat()\n\n/**\n * Computes the inverse hyperbolic tangent of the value [x].\n *\n
* The returned value is `y` such that `tanh(y) == x`.\n *\n * Special cases:\n *   - `tanh(NaN)` is `NaN`\n *   -
`tanh(x)` is `NaN` when `x > 1` or `x < -1`\n *   - `tanh(1.0)` is `+Inf`\n *   - `tanh(-1.0)` is `-Inf`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun atanh(x: Float): Float =
nativeMath.atanh(x.toDouble()).toFloat()\n\n/**\n * Computes `sqrt(x^2 + y^2)` without intermediate overflow or
underflow.\n *\n * Special cases:\n *   - returns `+Inf` if any of arguments is infinite\n *   - returns `NaN` if any of
arguments is `NaN` and the other is not infinite\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun
hypot(x: Float, y: Float): Float = nativeMath.hypot(x.toDouble(), y.toDouble()).toFloat()\n\n/**\n * Computes the
positive square root of the value [x].\n *\n * Special cases:\n *   - `sqrt(x)` is `NaN` when `x < 0` or `x` is `NaN`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sqrt(x: Float): Float =
nativeMath.sqrt(x.toDouble()).toFloat()\n\n/**\n * Computes Euler's number `e` raised to the power of the value
[x].\n *\n * Special cases:\n *   - `exp(NaN)` is `NaN`\n *   - `exp(+Inf)` is `+Inf`\n *   - `exp(-Inf)` is `0.0`\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun exp(x: Float): Float =
nativeMath.exp(x.toDouble()).toFloat()\n\n/**\n * Computes `exp(x) - 1`.\n *\n * This function can be implemented
to produce more precise result for [x] near zero.\n *\n * Special cases:\n *   - `expm1(NaN)` is `NaN`\n *   -
`expm1(+Inf)` is `+Inf`\n *   - `expm1(-Inf)` is `-1.0`\n *\n * @see [exp] function.\n
*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun expm1(x: Float): Float =

nativeMath.expm1(x.toDouble()).toFloat()\n\n/**\n * Computes the logarithm of the value [x] to the given [base].\n *\n * Special cases:\n *   - `log(x, b)` is `NaN` if either `x` or `b` are `NaN`\n *   - `log(x, b)` is `NaN` when `x < 0` or `b <= 0` or `b == 1.0`\n *   - `log(+Inf, +Inf)` is `NaN`\n *   - `log(+Inf, b)` is `+Inf` for `b > 1` and `-Inf` for `b < 1`\n *   - `log(0.0, b)` is `-Inf` for `b > 1` and `+Inf` for `b > 1`\n *\n * See also logarithm functions for common fixed bases: [ln], [log10] and [log2].\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun log(x: Float, base: Float): Float = log(x.toDouble(), base.toDouble()).toFloat()\n\n/**\n * Computes the natural logarithm (base `E`) of the value [x].\n *\n * Special cases:\n *   - `ln(NaN)` is `NaN`\n *   - `ln(x)` is `NaN` when `x < 0.0`\n *   - `ln(+Inf)` is `+Inf`\n *   - `ln(0.0)` is `-Inf`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ln(x: Float): Float = nativeMath.log(x.toDouble()).toFloat()\n\n/**\n * Computes the common logarithm (base 10) of the value [x].\n *\n * @see [ln] function for special cases.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun log10(x: Float): Float = nativeMath.log10(x.toDouble()).toFloat()\n\n/**\n * Computes the binary logarithm (base 2) of the value [x].\n *\n * @see [ln] function for special cases.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun log2(x: Float): Float = nativeMath.log2(x.toDouble()).toFloat()\n\n/**\n * Computes `ln(a + 1)`.\n *\n * This function can be implemented to produce more precise result for [x] near zero.\n *\n * Special cases:\n *   - `ln1p(NaN)` is `NaN`\n *   - `ln1p(x)` is `NaN` where `x < -1.0`\n *   - `ln1p(-1.0)` is `-Inf`\n *   - `ln1p(+Inf)` is `+Inf`\n *\n * @see [ln] function\n * @see [expm1] function\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ln1p(x: Float): Float = nativeMath.log1p(x.toDouble()).toFloat()\n\n/**\n * Rounds the given value [x] to an integer towards positive infinity.\n\n * @return the smallest Float value that is greater than the given value [x] and is a mathematical integer.\n *\n * Special cases:\n *   - `ceil(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun ceil(x: Float): Float = nativeMath.ceil(x.toDouble()).toFloat()\n\n/**\n * Rounds the given value [x] to an integer towards negative infinity.\n\n * @return the largest Float value that is smaller than the given value [x] and is a mathematical integer.\n *\n * Special cases:\n *   - `floor(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun floor(x: Float): Float = nativeMath.floor(x.toDouble()).toFloat()\n\n/**\n * Rounds the given value [x] to an integer towards zero.\n *\n * @return the value [x] having its fractional part truncated.\n *\n * Special cases:\n *   - `truncate(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun truncate(x: Float): Float = truncate(x.toDouble()).toFloat()\n\n/**\n * Rounds the given value [x] towards the closest integer with ties rounded towards even integer.\n *\n * Special cases:\n *   - `round(x)` is `x` where `x` is `NaN` or `+Inf` or `-Inf` or already a mathematical integer.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun round(x: Float): Float = round(x.toDouble()).toFloat()\n\n/**\n * Returns the absolute value of the given value [x].\n *\n * Special cases:\n *   - `abs(NaN)` is `NaN`\n *\n * @see absoluteValue extension property for [Float]\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun abs(x: Float): Float = nativeMath.abs(x.toDouble()).toFloat()\n\n/**\n * Returns the sign of the given value [x]:\n *   - `-1.0` if the value is negative,\n *   - zero if the value is zero,\n *   - `1.0` if the value is positive\n *\n * Special case:\n *   - `sign(NaN)` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun sign(x: Float): Float = nativeMath.sign(x.toDouble()).toFloat()\n\n/**\n * Returns the smaller of two values.\n *\n * If either value is `NaN`, then the result is `NaN`.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun min(a: Float, b: Float): Float = nativeMath.min(a, b)\n/**\n * Returns the greater of two values.\n *\n * If either value is `NaN`, then the result is `NaN`.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun max(a: Float, b: Float): Float = nativeMath.max(a, b)\n\n// extensions\n\n/**\n * Raises this value to the power [x].\n *\n * Special cases:\n *   - `b.pow(0.0)` is `1.0`\n *   - `b.pow(1.0) == b`\n *   - `b.pow(NaN)` is `NaN`\n *   - `NaN.pow(x)` is `NaN` for `x != 0.0`\n *   - `b.pow(Inf)` is `NaN` for `abs(b) == 1.0`\n *   - `b.pow(x)` is `NaN` for `b < 0` and `x` is finite and not an integer\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.pow(x: Float): Float = nativeMath.pow(this.toDouble(), x.toDouble()).toFloat()\n\n/**\n * Raises this value to the integer power [n].\n *\n * See the other overload of [pow] for details.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.pow(n: Int): Float = nativeMath.pow(this.toDouble(), n.toDouble()).toFloat()\n\n/**\n * Returns the absolute value of this value.\n *\n * Special cases:\n *   - `NaN.absoluteValue` is `NaN`\n *\n * @see abs function\n

*/\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Float.absoluteValue: Float get() = nativeMath.abs(this.toDouble()).toFloat()\n\n/**\n * Returns the sign of this value:\n *   - `-1.0` if the value is negative,\n *   - zero if the value is zero,\n *   - `1.0` if the value is positive\n *\n * Special case:\n *   - `NaN.sign` is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Float.sign: Float get() = nativeMath.sign(this.toDouble()).toFloat()\n\n/**\n * Returns this value with the sign bit same as of the [sign] value.\n *\n * If [sign] is `NaN` the sign of the result is undefined.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.withSign(sign: Float): Float = this.toDouble().withSign(sign.toDouble()).toFloat()\n/**\n * Returns this value with the sign bit same as of the [sign] value.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.withSign(sign: Int): Float = this.toDouble().withSign(sign.toDouble()).toFloat()\n\n\n/**\n * Rounds this [Float] value to the nearest integer and converts the result to [Int].\n * Ties are rounded towards positive infinity.\n *\n * Special cases:\n *   - `x.roundToInt() == Int.MAX_VALUE` when `x > Int.MAX_VALUE`\n *   - `x.roundToInt() == Int.MIN_VALUE` when `x < Int.MIN_VALUE`\n *\n * @throws IllegalArgumentException when this value is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.roundToInt(): Int = toDouble().roundToInt()\n\n/**\n * Rounds this [Float] value to the nearest integer and converts the result to [Long].\n * Ties are rounded towards positive infinity.\n *\n * Special cases:\n *   - `x.roundToLong() == Long.MAX_VALUE` when `x > Long.MAX_VALUE`\n *   - `x.roundToLong() == Long.MIN_VALUE` when `x < Long.MIN_VALUE`\n *\n * @throws IllegalArgumentException when this value is `NaN`\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun Float.roundToLong(): Long = toDouble().roundToLong()\n\n\n\n/**\n * Returns the absolute value of the given value [n].\n *\n * Special cases:\n *   - `abs(Int.MIN_VALUE)` is `Int.MIN_VALUE` due to an overflow\n *\n * @see absoluteValue extension property for [Int]\n */\n// TODO: remove manual 'or' when KT-19290 is fixed\n@SinceKotlin(\"1.2\")\npublic fun abs(n: Int): Int = if (n < 0) (-n or 0) else n\n\n/**\n * Returns the smaller of two values.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun min(a: Int, b: Int): Int = nativeMath.min(a, b)\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline fun max(a: Int, b: Int): Int = nativeMath.max(a, b)\n\n/**\n * Returns the absolute value of this value.\n *\n * Special cases:\n *   - `Int.MIN_VALUE.absoluteValue` is `Int.MIN_VALUE` due to an overflow\n *\n * @see abs function\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Int.absoluteValue: Int get() = abs(this)\n\n/**\n * Returns the sign of this value:\n *   - `-1` if the value is negative,\n *   - `0` if the value is zero,\n *   - `1` if the value is positive\n */\n@SinceKotlin(\"1.2\")\npublic val Int.sign: Int get() = when {\n   this < 0 -> -1\n   this > 0 -> 1\n   else -> 0\n}\n\n\n/**\n * Returns the absolute value of the given value [n].\n *\n * Special cases:\n *   - `abs(Long.MIN_VALUE)` is `Long.MIN_VALUE` due to an overflow\n *\n * @see absoluteValue extension property for [Long]\n */\n@SinceKotlin(\"1.2\")\npublic fun abs(n: Long): Long = if (n < 0) -n else n\n\n/**\n * Returns the smaller of two values.\n */\n@SinceKotlin(\"1.2\")\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun min(a: Long, b: Long): Long = if (a <= b) a else b\n\n/**\n * Returns the greater of two values.\n */\n@SinceKotlin(\"1.2\")\n@Suppress(\"NOTHING_TO_INLINE\")\npublic inline fun max(a: Long, b: Long): Long = if (a >= b) a else b\n\n/**\n * Returns the absolute value of this value.\n *\n * Special cases:\n *   - `Long.MIN_VALUE.absoluteValue` is `Long.MIN_VALUE` due to an overflow\n *\n * @see abs function\n */\n@SinceKotlin(\"1.2\")\n@InlineOnly\npublic inline val Long.absoluteValue: Long get() = abs(this)\n\n/**\n * Returns the sign of this value:\n *   - `-1` if the value is negative,\n *   - `0` if the value is zero,\n *   - `1` if the value is positive\n */\n@SinceKotlin(\"1.2\")\npublic val Long.sign: Int get() = when {\n   this < 0 -> -1\n   this > 0 -> 1\n   else -> 0\n}\n\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage

kotlin.collections\n\n/**\n * Provides a skeletal implementation of the [MutableCollection] interface.\n *\n * @param E the type of elements contained in the collection. The collection is invariant on its element type.\n */\npublic abstract class AbstractMutableCollection<E> protected constructor() : AbstractCollection<E>(), MutableCollection<E> {\n   abstract override fun add(element: E): Boolean\n\n   override fun remove(element: E): Boolean {\n   val iterator = iterator()\n   while (iterator.hasNext()) {\n   if (iterator.next() == element) {\n   iterator.remove()\n   return true\n   }\n   }\n   return false\n   }\n\n   override fun addAll(elements: Collection<E>): Boolean {\n   var modified = false\n   for (element in elements) {\n   if (add(element)) modified = true\n   }\n   return modified\n   }\n\n   override fun removeAll(elements: Collection<E>): Boolean = (this as MutableIterable<E>).removeAll { it in elements }\n   override fun retainAll(elements: Collection<E>): Boolean = (this as MutableIterable<E>).removeAll { it !in elements }\n\n   override fun clear(): Unit {\n   val iterator = this.iterator()\n   while (iterator.hasNext()) {\n   iterator.next()\n   iterator.remove()\n   }\n   }\n\n   open fun toJSON(): Any = this.toArray()\n}\n\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT AbstractList\n * Copyright 2007 Google Inc.\n*/\n\n\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the [MutableList] interface.\n *\n * @param E the type of elements contained in the list. The list is invariant on its element type.\n */\npublic abstract class AbstractMutableList<E> protected constructor() : AbstractMutableCollection<E>(), MutableList<E> {\n   protected var modCount: Int = 0\n\n   abstract override fun add(index: Int, element: E): Unit\n   abstract override fun removeAt(index: Int): E\n   abstract override fun set(index: Int, element: E): E\n\n   override fun add(element: E): Boolean {\n   add(size, element)\n   return true\n   }\n\n   override fun addAll(index: Int, elements: Collection<E>): Boolean {\n   var _index = index\n   var changed = false\n   for (e in elements) {\n   add(_index++, e)\n   changed = true\n   }\n   return changed\n   }\n\n   override fun clear() {\n   removeRange(0, size)\n   }\n\n   override fun removeAll(elements: Collection<E>): Boolean = removeAll { it in elements }\n   override fun retainAll(elements: Collection<E>): Boolean = removeAll { it !in elements }\n\n\n   override fun iterator(): MutableIterator<E> = IteratorImpl()\n\n   override fun contains(element: E): Boolean = indexOf(element) >= 0\n\n   override fun indexOf(element: E): Int {\n   for (index in 0..lastIndex) {\n   if (get(index) == element) {\n   return index\n   }\n   }\n   return -1\n   }\n\n   override fun lastIndexOf(element: E): Int {\n   for (index in lastIndex downTo 0) {\n   if (get(index) == element) {\n   return index\n   }\n   }\n   return -1\n   }\n\n   override fun listIterator(): MutableListIterator<E> = listIterator(0)\n   override fun listIterator(index: Int): MutableListIterator<E> = ListIteratorImpl(index)\n\n\n   override fun subList(fromIndex: Int, toIndex: Int): MutableList<E> = SubList(this, fromIndex, toIndex)\n\n   /**\n   * Removes the range of elements from this list starting from [fromIndex] and ending with but not including [toIndex].\n   */\n   protected open fun removeRange(fromIndex: Int, toIndex: Int) {\n   val iterator = listIterator(fromIndex)\n   repeat(toIndex - fromIndex) {\n   iterator.next()\n   iterator.remove()\n   }\n   }\n\n   /**\n   * Compares this list with another list instance with the ordered structural equality.\n   *\n   * @return true, if [other] instance is a [List] of the same size, which contains the same elements in the same order.\n   */\n   override fun equals(other: Any?): Boolean {\n   if (other === this) return true\n   if (other !is List<*>) return false\n\n   return AbstractList.orderedEquals(this, other)\n   }\n\n   /**\n   * Returns the hash code value for this list.\n   */\n   override fun hashCode(): Int = AbstractList.orderedHashCode(this)\n\n\n   private open inner class IteratorImpl : MutableIterator<E> {\n   /** the index of the item that will be returned on the next call to [next]`()` */\n   protected var index = 0\n   /** the index of the item that was returned on the previous call to [next]`()`\n   * or [ListIterator.previous]`()` (for `ListIterator`),\n   * -1 if no such item exists\n   */\n   protected var last = -1\n\n   override fun hasNext(): Boolean = index < size\n\n   override fun next(): E {\n   if (!hasNext())

throw NoSuchElementException()\n   last = index++\n   return get(last)\n   }\n\n   override fun remove() {\n   check(last != -1) { \"Call next() or previous() before removing element from the iterator.\"}\n\n   removeAt(last)\n   index = last\n   last = -1\n   }\n   }\n\n   /**\n   * Implementation of `MutableListIterator` for abstract lists.\n   */\n   private inner class ListIteratorImpl(index: Int) : IteratorImpl(), MutableListIterator<E> {\n\n   init {\n   AbstractList.checkPositionIndex(index, this@AbstractMutableList.size)\n   this.index = index\n   }\n\n   override fun hasPrevious(): Boolean = index > 0\n\n   override fun nextIndex(): Int = index\n\n   override fun previous(): E {\n   if (!hasPrevious()) throw NoSuchElementException()\n\n   last = --index\n   return get(last)\n   }\n\n   override fun previousIndex(): Int = index - 1\n\n   override fun add(element: E) {\n   add(index, element)\n   index++\n   last = -1\n   }\n\n   override fun set(element: E) {\n   check(last != -1) { \"Call next() or previous() before updating element value with the iterator.\"}\n   this@AbstractMutableList[last] = element\n   }\n   }\n\n   private class SubList<E>(private val list: AbstractMutableList<E>, private val fromIndex: Int, toIndex: Int) : AbstractMutableList<E>(), RandomAccess {\n   private var _size: Int = 0\n\n   init {\n   AbstractList.checkRangeIndexes(fromIndex, toIndex, list.size)\n   this._size = toIndex - fromIndex\n   }\n\n   override fun add(index: Int, element: E) {\n   AbstractList.checkPositionIndex(index, _size)\n\n   list.add(fromIndex + index, element)\n   _size++\n   }\n\n   override fun get(index: Int): E {\n   AbstractList.checkElementIndex(index, _size)\n   return list[fromIndex + index]\n   }\n\n   override fun removeAt(index: Int): E {\n   AbstractList.checkElementIndex(index, _size)\n\n   val result = list.removeAt(fromIndex + index)\n   _size--\n   return result\n   }\n\n   override fun set(index: Int, element: E): E {\n   AbstractList.checkElementIndex(index, _size)\n   return list.set(fromIndex + index, element)\n   }\n\n   override val size: Int get() = _size\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT AbstractMap\n * Copyright 2007 Google Inc.\n */\n\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the [MutableMap] interface.\n *\n * The implementor is required to implement the [entries] property, which should return mutable set of map entries, and the [put] function.\n *\n * @param K the type of map keys. The map is invariant on its key type.\n * @param V the type of map values. The map is invariant on its value type.\n */\npublic abstract class AbstractMutableMap<K, V> protected constructor() : AbstractMap<K, V>(), MutableMap<K, V> {\n\n   /**\n   * A mutable [Map.Entry] shared by several [Map] implementations.\n   */\n   internal open class SimpleEntry<K, V>(override val key: K, value: V) : MutableMap.MutableEntry<K, V> {\n   constructor(entry: Map.Entry<K, V>) : this(entry.key, entry.value)\n\n   private var _value = value\n\n   override val value: V get() = _value\n\n   override fun setValue(newValue: V): V {\n   val oldValue = this._value\n   this._value = newValue\n   return oldValue\n   }\n\n   override fun hashCode(): Int = entryHashCode(this)\n   override fun toString(): String = entryToString(this)\n   override fun equals(other: Any?): Boolean = entryEquals(this, other)\n\n   }\n\n   override fun clear() {\n   entries.clear()\n   }\n\n   private var _keys: MutableSet<K>? = null\n   override val keys: MutableSet<K> get() {\n   if (_keys == null) {\n   _keys = object : AbstractMutableSet<K>() {\n   override fun add(element: K): Boolean = throw UnsupportedOperationException(\"Add is not supported on keys\")\n   override fun clear() {\n   this@AbstractMutableMap.clear()\n   }\n\n   override operator fun contains(element: K): Boolean = containsKey(element)\n\n   override operator fun iterator(): MutableIterator<K> {\n   val entryIterator = entries.iterator()\n   return object : MutableIterator<K> {\n   override fun hasNext(): Boolean = entryIterator.hasNext()\n   override fun next(): K = entryIterator.next().key\n   override fun remove() = entryIterator.remove()\n   }\n   }\n\n   override fun remove(element: K): Boolean {\n   if

(containsKey(element)) {\n   this@AbstractMutableMap.remove(element)\n   return true\n   }\n   return false\n   }\n\n   override val size: Int get() = this@AbstractMutableMap.size\n   }\n   }\n\n   abstract override fun put(key: K, value: V): V?\n\n   override fun putAll(from: Map<out K, V>) {\n   for ((key, value) in from) {\n   put(key, value)\n   }\n   }\n\n   private var _values: MutableCollection<V>? = null\n   override val values: MutableCollection<V> get() {\n   if (_values == null) {\n   _values = object : AbstractMutableCollection<V>() {\n   override fun add(element: V): Boolean = throw UnsupportedOperationException(\"Add is not supported on values\")\n   override fun clear() = this@AbstractMutableMap.clear()\n\n   override operator fun contains(element: V): Boolean = containsValue(element)\n\n   override operator fun iterator(): MutableIterator<V> {\n   val entryIterator = entries.iterator()\n   return object : MutableIterator<V> {\n   override fun hasNext(): Boolean = entryIterator.hasNext()\n   override fun next(): V = entryIterator.next().value\n   override fun remove() = entryIterator.remove()\n   }\n   }\n\n   override val size: Int get() = this@AbstractMutableMap.size\n\n   // TODO: should we implement them this way? Currently it's unspecified in JVM\n   override fun equals(other: Any?): Boolean {\n   if (this === other) return true\n   if (other !is Collection<*>) return false\n   return AbstractList.orderedEquals(this, other)\n   }\n   override fun hashCode(): Int = AbstractList.orderedHashCode(this)\n   }\n   }\n   return _values!!\n   }\n\n   override fun remove(key: K): V? {\n   val iter = entries.iterator()\n   while (iter.hasNext()) {\n   var entry = iter.next()\n   val k = entry.key\n   if (key == k) {\n   val value = entry.value\n   iter.remove()\n   return value\n   }\n   }\n   return null\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\npackage kotlin.collections\n\n/**\n * Provides a skeletal implementation of the [MutableSet] interface.\n *\n * @param E the type of elements contained in the set. The set is invariant on its element type.\n */\npublic abstract class AbstractMutableSet<E> protected constructor() : AbstractMutableCollection<E>(), MutableSet<E> {\n\n   /**\n   * Compares this set with another set instance with the unordered structural equality.\n   *\n   * @return true, if [other] instance is a [Set] of the same size, all elements of which are contained in this set.\n   */\n   override fun equals(other: Any?): Boolean {\n   if (other === this) return true\n   if (other !is Set<*>) return false\n   return AbstractSet.setEquals(this, other)\n   }\n\n   /**\n   * Returns the hash code value for this set.\n   */\n   override fun hashCode(): Int = AbstractSet.unorderedHashCode(this)\n\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.collections\n\n/**\n * Provides a [MutableList] implementation, which uses a resizable array as its backing storage.\n *\n * This implementation doesn't provide a way to manage capacity, as backing JS array is resizeable itself.\n * There is no speed advantage to pre-allocating array sizes in JavaScript, so this implementation does not include any of the\n * capacity and \"growth increment\" concepts.\n */\npublic open class ArrayList<E> internal constructor(private var array: Array<Any?>) : AbstractMutableList<E>(), RandomAccess {\n\n   /**\n   * Creates an empty [ArrayList].\n   * @param capacity initial capacity (ignored)\n   */\n   public constructor(@Suppress(\"UNUSED_PARAMETER\") capacity: Int = 0) : this(emptyArray()) {}\n   /**\n   * Creates an [ArrayList] filled from the [elements] collection.\n   */\n   public constructor(elements:

Collection<E>) : this(elements.toTypedArray<Any?>()) {}\n\n /** Does nothing in this ArrayList implementation. */\n public fun trimToSize() {}\n /** Does nothing in this ArrayList implementation. */\n public fun ensureCapacity(@Suppress(\"UNUSED_PARAMETER\") minCapacity: Int) {}\n override val size: Int get() = array.size\n override fun get(index: Int): E = array[rangeCheck(index)] as E\n override fun set(index: Int, element: E): E {\n rangeCheck(index)\n return array[index].apply { array[index] = element } as E\n }\n\n override fun add(element: E): Boolean {\n array.asDynamic().push(element)\n modCount++\n return true\n }\n\n override fun add(index: Int, element: E): Unit {\n array.asDynamic().splice(insertionRangeCheck(index), 0, element)\n modCount++\n }\n\n override fun addAll(elements: Collection<E>): Boolean {\n if (elements.isEmpty()) return false\n\n array += elements.toTypedArray<Any?>()\n modCount++\n return true\n }\n\n override fun addAll(index: Int, elements: Collection<E>): Boolean {\n insertionRangeCheck(index)\n\n if (index == size) return addAll(elements)\n if (elements.isEmpty()) return false\n when (index) {\n size -> return addAll(elements)\n 0 -> array = elements.toTypedArray<Any?>() + array\n else -> array = array.copyOfRange(0, index).asDynamic().concat(elements.toTypedArray<Any?>(), array.copyOfRange(index, size))\n }\n\n modCount++\n return true\n }\n\n override fun removeAt(index: Int): E {\n rangeCheck(index)\n modCount++\n return if (index == lastIndex)\n array.asDynamic().pop()\n else\n array.asDynamic().splice(index, 1)[0]\n }\n\n override fun remove(element: E): Boolean {\n for (index in array.indices) {\n if (array[index] == element) {\n array.asDynamic().splice(index, 1)\n modCount++\n return true\n }\n }\n return false\n }\n\n override fun removeRange(fromIndex: Int, toIndex: Int) {\n modCount++\n array.asDynamic().splice(fromIndex, toIndex - fromIndex)\n }\n\n override fun clear() {\n array = emptyArray()\n modCount++\n }\n\n\n override fun indexOf(element: E): Int = array.indexOf(element)\n\n override fun lastIndexOf(element: E): Int = array.lastIndexOf(element)\n\n override fun toString() = arrayToString(array)\n override fun toArray(): Array<Any?> = js(\"[]\").slice.call(array)\n\n\n private fun rangeCheck(index: Int) = index.apply {\n AbstractList.checkElementIndex(index, size)\n }\n\n private fun insertionRangeCheck(index: Int) = index.apply {\n AbstractList.checkPositionIndex(index, size)\n }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.collections\n\ninternal interface EqualityComparator {\n /**\n * Subclasses must override to return a value indicating\n * whether or not two keys or values are equal.\n */\n abstract fun equals(value1: Any?, value2: Any?): Boolean\n\n /**\n * Subclasses must override to return the hash code of a given key.\n */\n abstract fun getHashCode(value: Any?): Int\n\n object HashCode : EqualityComparator {\n override fun equals(value1: Any?, value2: Any?): Boolean = value1 == value2\n\n override fun getHashCode(value: Any?): Int = value?.hashCode() ?: 0\n }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT AbstractHashMap\n * Copyright 2008 Google Inc.\n */\n\npackage kotlin.collections\n\nimport kotlin.collections.Map.Entry\nimport kotlin.collections.MutableMap.MutableEntry\n\n\n/**\n * Hash table based implementation of the [MutableMap] interface.\n *\n * This implementation makes no guarantees regarding the order of enumeration of [keys], [values] and [entries] collections.\n */\npublic open class HashMap<K, V> : AbstractMutableMap<K, V> {\n\n private inner class EntrySet : AbstractMutableSet<MutableEntry<K, V>>()

{\n\n   override fun add(element: MutableEntry<K, V>): Boolean = throw UnsupportedOperationException(\"Add is not supported on entries\")\n   override fun clear() {\n   this@HashMap.clear()\n   }\n\n   override operator fun contains(element: MutableEntry<K, V>): Boolean = containsEntry(element)\n\n   override operator fun iterator(): MutableIterator<MutableEntry<K, V>> = internalMap.iterator()\n\n   override fun remove(element: MutableEntry<K, V>): Boolean {\n   if (contains(element)) {\n   this@HashMap.remove(element.key)\n   return true\n   }\n   return false\n   }\n\n   override val size: Int get() = this@HashMap.size\n   }\n\n\n   /**\n   * Internal implementation of the map: either string-based or hashcode-based.\n   */\n   private val internalMap: InternalMap<K, V>\n\n   private val equality: EqualityComparator\n\n   internal constructor(internalMap: InternalMap<K, V>) : super() {\n   this.internalMap = internalMap\n   this.equality = internalMap.equality\n   }\n\n   /**\n   * Constructs an empty [HashMap] instance.\n   */\n   constructor() : this(InternalHashCodeMap(EqualityComparator.HashCode))\n\n   /**\n   * Constructs an empty [HashMap]\n   instance.\n   *\n   * @param initialCapacity the initial capacity (ignored)\n   * @param loadFactor   the load factor (ignored)\n   *\n   * @throws IllegalArgumentException if the initial capacity or load factor are negative\n   */\n   constructor(initialCapacity: Int, loadFactor: Float = 0f) : this() {\n   // This implementation of HashMap has no need of load factors or capacities.\n   require(initialCapacity >= 0) { \"Negative initial capacity\" }\n   require(loadFactor >= 0) { \"Non-positive load factor\" }\n   }\n\n   /**\n   * Constructs an instance of [HashMap] filled with the contents of the specified [original] map.\n   */\n   constructor(original: Map<out K, V>) : this() {\n   this.putAll(original)\n   }\n\n   override fun clear() {\n   internalMap.clear()\n//   structureChanged(this)\n   }\n\n   override fun containsKey(key: K): Boolean = internalMap.contains(key)\n\n   override fun containsValue(value: V): Boolean = internalMap.any { equality.equals(it.value, value) }\n\n   private var _entries: MutableSet<MutableMap.MutableEntry<K, V>>? = null\n   override val entries: MutableSet<MutableMap.MutableEntry<K, V>> get() {\n   if (_entries == null) {\n   _entries = createEntrySet()\n   }\n   return _entries!!\n   }\n\n   protected open fun createEntrySet(): MutableSet<MutableMap.MutableEntry<K, V>> = EntrySet()\n\n   override operator fun get(key: K): V? = internalMap.get(key)\n\n   override fun put(key: K, value: V): V? = internalMap.put(key, value)\n\n   override fun remove(key: K): V? = internalMap.remove(key)\n\n   override val size: Int get() = internalMap.size\n}\n\n/**\n * Constructs the specialized implementation of [HashMap] with [String] keys, which stores the keys as properties of\n * JS object without hashing them.\n */\npublic fun <V> stringMapOf(vararg pairs: Pair<String, V>): HashMap<String, V> {\n   return HashMap<String, V>(InternalStringMap(EqualityComparator.HashCode)).apply { putAll(pairs) }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT HashSet\n * Copyright 2008 Google Inc.\n */\n\npackage kotlin.collections\n\n/**\n * The implementation of the [MutableSet] interface, backed by a [HashMap] instance.\n */\npublic open class HashSet<E> : AbstractMutableSet<E> {\n\n   private val map: HashMap<E, Any>\n\n   /**\n   * Constructs a new empty [HashSet].\n   */\n   constructor() {\n   map = HashMap<E, Any>()\n   }\n\n   /**\n   * Constructs a new [HashSet] filled with the elements of the specified collection.\n   */\n   constructor(elements: Collection<E>) {\n   map = HashMap<E, Any>(elements.size)\n   addAll(elements)\n   }\n\n   /**\n   * Constructs a new empty [HashSet].\n   *\n   * @param initialCapacity the initial capacity (ignored)\n   * @param loadFactor   the load factor (ignored)\n   *\n   * @throws IllegalArgumentException if the initial capacity or load factor are negative\n   */\n   constructor(initialCapacity: Int, loadFactor: Float = 0.0f) {\n   map = HashMap<E, Any>(initialCapacity, loadFactor)\n   }\n\n   /**\n   * Protected constructor to specify the underlying map. This is used by\n   * LinkedHashSet.\n\n   * @param map underlying map to use.\n   */\n   internal constructor(map: HashMap<E, Any>) {\n   this.map = map\n   }\n\n   override fun add(element: E): Boolean {\n   val old =

map.put(element, this)\n   return old == null\n   }\n\n   override fun clear() {\n   map.clear()\n   }\n\n//   public override fun clone(): Any {\n//   return HashSet<E>(this)\n//   }\n\n   override operator fun contains(element: E): Boolean = map.containsKey(element)\n\n   override fun isEmpty(): Boolean = map.isEmpty()\n\n   override fun iterator(): MutableIterator<E> = map.keys.iterator()\n\n   override fun remove(element: E): Boolean = map.remove(element) != null\n\n   override val size: Int get() = map.size\n}\n}\n\n/**\n * Creates a new instance of the specialized implementation of [HashSet] with the specified [String] elements,\n * which elements the keys as properties of JS object without hashing them.\n */\npublic fun stringSetOf(vararg elements: String): HashSet<String> {\n   return HashSet(stringMapOf<Any>()).apply { addAll(elements) }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT InternalHashCodeMap\n * Copyright 2008 Google Inc.\n */\n\npackage kotlin.collections\n\nimport kotlin.collections.MutableMap.MutableEntry\nimport kotlin.collections.AbstractMutableMap.SimpleEntry\n\n/**\n * A simple wrapper around JavaScriptObject to provide [java.util.Map]-like semantics for any\n * key type.\n *\n *\n * Implementation notes:\n *\n *\n * A key's hashCode is the index in backingMap which should contain that key. Since several keys may\n * have the same hash, each value in hashCodeMap is actually an array containing all entries whose\n * keys share the same hash.\n */\ninternal class InternalHashCodeMap<K, V>(override val equality: EqualityComparator) : InternalMap<K, V> {\n\n   private var backingMap: dynamic = createJsMap()\n   override var size: Int = 0\n   private set\n\n   override fun put(key: K, value: V): V? {\n   val hashCode = equality.getHashCode(key)\n   val chainOrEntry = getChainOrEntryOrNull(hashCode)\n   if (chainOrEntry == null) {\n   // This is a new chain, put it to the map.\n   backingMap[hashCode] = SimpleEntry(key, value)\n   }\n   else {\n   if (chainOrEntry !is Array<*>) {\n   // It is an entry\n   val entry: SimpleEntry<K, V> = chainOrEntry\n   if (equality.equals(entry.key, key)) {\n   return entry.setValue(value)\n   }\n   else {\n   backingMap[hashCode] = arrayOf(entry, SimpleEntry(key, value))\n   size++\n   return null\n   }\n   }\n   else {\n   // Chain already exists, perhaps key also exists.\n   val chain: Array<MutableEntry<K, V>> = chainOrEntry\n   val entry = chain.findEntryInChain(key)\n   if (entry != null) {\n   return entry.setValue(value)\n   }\n   chain.asDynamic().push(SimpleEntry(key, value))\n   }\n   }\n   size++\n//   structureChanged(host)\n   return null\n   }\n\n   override fun remove(key: K): V? {\n   val hashCode = equality.getHashCode(key)\n   val chainOrEntry = getChainOrEntryOrNull(hashCode) ?: return null\n   if (chainOrEntry !is Array<*>) {\n   val entry: MutableEntry<K, V> = chainOrEntry\n   if (equality.equals(entry.key, key)) {\n   deleteProperty(backingMap, hashCode)\n   size--\n   return entry.value\n   }\n   else {\n   return null\n   }\n   }\n   else {\n   val chain: Array<MutableEntry<K, V>> = chainOrEntry\n   for (index in chain.indices) {\n   val entry = chain[index]\n   if (equality.equals(key, entry.key)) {\n   if (chain.size == 1) {\n   chain.asDynamic().length = 0\n   // remove the whole array\n   deleteProperty(backingMap, hashCode)\n   } else {\n   // splice out the entry we're removing\n   chain.asDynamic().splice(index, 1)\n   }\n   size--\n//   structureChanged(host)\n   return entry.value\n   }\n   }\n   }\n   return null\n   }\n\n   override fun clear() {\n   backingMap = createJsMap()\n   size = 0\n   }\n\n   override fun contains(key: K): Boolean = getEntry(key) != null\n\n   override fun get(key: K): V? = getEntry(key)?.value\n\n   private fun getEntry(key: K): MutableEntry<K, V>? {\n   val chainOrEntry = getChainOrEntryOrNull(equality.getHashCode(key)) ?: return null\n   if (chainOrEntry !is Array<*>) {\n   val entry: MutableEntry<K, V> = chainOrEntry\n   if (equality.equals(entry.key, key)) {\n   return entry\n   }\n   else {\n   return null\n   }\n   }\n   else {\n   val chain:

Array<MutableEntry<K, V>> = chainOrEntry\n   return chain.findEntryInChain(key)\n   }\n   }\n\n
private fun Array<MutableEntry<K, V>>.findEntryInChain(key: K): MutableEntry<K, V>? =\n   firstOrNull {
entry -> equality.equals(entry.key, key) }\n\n   override fun iterator(): MutableIterator<MutableEntry<K, V>> {\n\n
    return object : MutableIterator<MutableEntry<K, V>> {\n   var state = -1 // -1 not ready, 0 - ready, 1 -
done\n\n   val keys: Array<Int> = js(\"Object\").keys(backingMap)\n   var keyIndex = -1\n\n   var
chainOrEntry: dynamic = null\n   var isChain = false\n   var itemIndex = -1\n   var lastEntry:
MutableEntry<K, V>? = null\n\n   private fun computeNext(): Int {\n   if (chainOrEntry != null &&
isChain) {\n   val chainSize: Int = chainOrEntry.unsafeCast<Array<MutableEntry<K, V>>>().size\n
    if (++itemIndex < chainSize)\n   return 0\n   }\n\n   if (++keyIndex < keys.size)
{\n   chainOrEntry = backingMap[keys[keyIndex]]\n   isChain = chainOrEntry is Array<*>\n
    itemIndex = 0\n   return 0\n   }\n   else {\n   chainOrEntry = null\n
    return 1\n   }\n   }\n\n   override fun hasNext(): Boolean {\n   if (state == -1)\n
    state = computeNext()\n   return state == 0\n   }\n\n   override fun next():
MutableEntry<K, V> {\n   if (!hasNext()) throw NoSuchElementException()\n   val lastEntry = if
(isChain) {\n   chainOrEntry.unsafeCast<Array<MutableEntry<K, V>>>()[itemIndex]\n   }\n
    else {\n   chainOrEntry.unsafeCast<MutableEntry<K, V>>()\n   }\n   this.lastEntry =
lastEntry\n   state = -1\n   return lastEntry\n   }\n\n   override fun remove() {\n
checkNotNull(lastEntry)\n   this@InternalHashCodeMap.remove(lastEntry!!.key)\n   lastEntry =
null\n   // the chain being iterated just got modified by InternalHashCodeMap.remove\n   itemIndex-
-\n   }\n   }\n   }\n\n   private fun getChainOrEntryOrNull(hashCode: Int): dynamic {\n   val
chainOrEntry = backingMap[hashCode]\n   return if (chainOrEntry === undefined) null else chainOrEntry\n
}\n\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the
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WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for
the specific language governing permissions and\n * limitations under the License.\n */\n\npackage
kotlin.collections\n\n/**\n * The common interface of [InternalStringMap] and [InternalHashCodeMap].\n
*/\ninternal interface InternalMap<K, V> : MutableIterable<MutableMap.MutableEntry<K, V>> {\n   val equality:
EqualityComparator\n   val size: Int\n   operator fun contains(key: K): Boolean\n   operator fun get(key: K):
V?\n\n   fun put(key: K, value: V): V?\n   fun remove(key: K): V?\n   fun clear(): Unit\n\n   fun createJsMap():
dynamic {\n   val result = js(\"Object.create(null)\")\n   // force to switch object representation to dictionary
mode\n   result[\"foo\"] = 1;\n   deleteProperty(result, \"foo\")\n   return result\n   }\n}","/*\n * Copyright
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OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language
governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT InternalStringMap\n *
Copyright 2008 Google Inc.\n */\npackage kotlin.collections\n\nimport
kotlin.collections.MutableMap.MutableEntry\n\n/**\n * A simple wrapper around JavaScript Map for key type is
string.\n *\n * Though this map is instantiated only with K=String, the K type is not fixed to String statically,\n *
because we want to have it erased to Any? in order not to generate type-safe override bridges for\n * [get],
[contains], [remove] etc, if they ever are generated.\n */\ninternal class InternalStringMap<K, V>(override val
equality: EqualityComparator) : InternalMap<K, V> {\n\n   private var backingMap: dynamic = createJsMap()\n
override var size: Int = 0\n   private set\n\n//   /**\n//   * A mod count to track 'value' replacements in map to
ensure that the 'value' that we have in the\n//   * iterator entry is guaranteed to be still correct.\n//   * This is to
optimize for the common scenario where the values are not modified during\n//   * iterations where the entries are

never stale.\n//   */\n//   private var valueMod: Int = 0\n\n   override operator fun contains(key: K): Boolean {\n   if (key !is String) return false\n   return backingMap[key] !== undefined\n   }\n\n   override operator fun get(key: K): V? {\n   if (key !is String) return null\n   val value = backingMap[key]\n   return if (value !== undefined) value.unsafeCast<V>() else null\n   }\n\n\n   override fun put(key: K, value: V): V? {\n   require(key is String)\n   val oldValue = backingMap[key]\n   backingMap[key] = value\n   if (oldValue === undefined) {\n   size++\n//   structureChanged(host)\n   return null\n   }\n   else {\n//   valueMod++\n   return oldValue.unsafeCast<V>()\n   }\n   }\n\n   override fun remove(key: K): V? {\n   if (key !is String) return null\n   val value = backingMap[key]\n   if (value !== undefined) {\n   deleteProperty(backingMap, key)\n   size--\n//   structureChanged(host)\n   return value.unsafeCast<V>()\n   }\n   else {\n//   valueMod++\n   return null\n   }\n   }\n\n\n   override fun clear() {\n   backingMap = createJsMap()\n   size = 0\n   }\n\n\n   override fun iterator(): MutableIterator<MutableEntry<K, V>> {\n   return object : MutableIterator<MutableEntry<K, V>> {\n   private val keys: Array<String> = js(\"Object\").keys(backingMap)\n   private val iterator = keys.iterator()\n   private var lastKey: String? = null\n\n   override fun hasNext(): Boolean = iterator.hasNext()\n\n   override fun next(): MutableEntry<K, V> {\n   val key = iterator.next()\n   lastKey = key\n   @Suppress(\"UNCHECKED_CAST\")\n   return newMapEntry(key as K)\n   }\n\n   override fun remove() {\n   @Suppress(\"UNCHECKED_CAST\")\n   this@InternalStringMap.remove(checkNotNull(lastKey) as K)\n   }\n   }\n   }\n\n   private fun newMapEntry(key: K): MutableEntry<K, V> = object : MutableEntry<K, V> {\n   override val key: K get() = key\n   override val value: V get() = this@InternalStringMap[key].unsafeCast<V>()\n\n   override fun setValue(newValue: V): V = this@InternalStringMap.put(key, newValue).unsafeCast<V>()\n\n   override fun hashCode(): Int = AbstractMap.entryHashCode(this)\n   override fun toString(): String = AbstractMap.entryToString(this)\n   override fun equals(other: Any?): Boolean = AbstractMap.entryEquals(this, other)\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT LinkedHashMap\n * Copyright 2008 Google Inc.\n */\npackage kotlin.collections\n\nimport kotlin.collections.MutableMap.MutableEntry\n\n/**\n * Hash table based implementation of the [MutableMap] interface, which additionally preserves the insertion order\n * of entries during the iteration.\n *\n * The insertion order is preserved by maintaining a doubly-linked list of all of its entries.\n */\npublic open class LinkedHashMap<K, V> : HashMap<K, V>, Map<K, V> {\n\n   /**\n   * The entry we use includes next/prev pointers for a doubly-linked circular\n   * list with a head node. This reduces the special cases we have to deal with\n   * in the list operations.\n\n   * Note that we duplicate the key from the underlying hash map so we can find\n   * the eldest entry. The alternative would have been to modify HashMap so more\n   * of the code was directly usable here, but this would have added some\n   * overhead to HashMap, or to reimplement most of the\n   * HashMap code here with\n   * small modifications. Paying a small storage cost only if you use\n   * LinkedHashMap and minimizing code size seemed like a better tradeoff\n   */\n   private class ChainEntry<K, V>(key: K, value: V) : AbstractMutableMap.SimpleEntry<K, V>(key, value) {\n   internal var next: ChainEntry<K, V>? = null\n   internal var prev: ChainEntry<K, V>? = null\n   }\n\n   private inner class EntrySet : AbstractMutableSet<MutableEntry<K, V>>() {\n\n   private inner class EntryIterator : MutableIterator<MutableEntry<K, V>> {\n   // The last entry that was returned from this iterator.\n   private var last: ChainEntry<K, V>? = null\n\n   // The next entry to return from this iterator.\n   private var next: ChainEntry<K, V>? = null\n\n   init {\n   next = head\n//   recordLastKnownStructure(map, this)\n   }\n\n   override fun hasNext(): Boolean {\n   return next !== null\n   }\n\n   override fun next(): MutableEntry<K, V> {\n//

checkStructuralChange(map, this)\n   if (!hasNext()) throw NoSuchElementException()\n\n   val current = next!!\n   last = current\n   next = current.next.takeIf { it !== head }\n   return current\n   }\n\n   override fun remove() {\n   check(last != null)\n//   checkStructuralChange(map, this)\n\n   last!!.remove()\n   map.remove(last!!.key)\n//   recordLastKnownStructure(map, this)\n   last = null\n   }\n   }\n\n   override fun add(element: MutableEntry<K, V>): Boolean = throw UnsupportedOperationException(\"Add is not supported on entries\")\n   override fun clear() {\n   this@LinkedHashMap.clear()\n   }\n\n   override operator fun contains(element: MutableEntry<K, V>): Boolean = containsEntry(element)\n\n   override operator fun iterator(): MutableIterator<MutableEntry<K, V>> = EntryIterator()\n\n   override fun remove(element: MutableEntry<K, V>): Boolean {\n   if (contains(element)) {\n   this@LinkedHashMap.remove(element.key)\n   return true\n   }\n   return false\n   }\n\n   override val size: Int get() = this@LinkedHashMap.size\n   }\n\n\n   /*\n   * The head of the insert order chain, which is a doubly-linked circular\n   * list.\n   *\n   * The most recently inserted node is at the end of the chain, ie.\n   * chain.prev.\n   */\n   private var head: ChainEntry<K, V>? = null\n\n   /**\n   * Add this node to the end of the chain.\n   */\n   private fun ChainEntry<K, V>.addToEnd() {\n   // This entry is not in the list.\n   check(next == null && prev == null)\n\n   val _head = head\n   if (_head == null) {\n   head = this\n   next = this\n   prev = this\n   } else {\n   // Chain is valid.\n   val _tail = checkNotNull(_head.prev)\n   // Update me.\n   prev = _tail\n   next = _head\n   // Update my new siblings: current head and old tail\n   _head.prev = this\n   _tail.next = this\n   }\n   }\n\n   /**\n   * Remove this node from the chain it is a part of.\n   */\n   private fun ChainEntry<K, V>.remove() {\n   if (this.next === this) {\n   // if this is single element, remove head\n   head = null\n   } else {\n   if (head === this) {\n   // if this is first element, move head to next\n   head = next\n   }\n   next!!.prev = prev\n   prev!!.next = next\n   }\n   next = null\n   prev = null\n   }\n\n   /*\n   * The hashmap that keeps track of our entries and the chain. Note that we\n   * duplicate the key here to eliminate changes to HashMap and minimize the\n   * code here, at the expense of additional space.\n   */\n   private val map: HashMap<K, ChainEntry<K, V>>\n\n   /**\n   * Constructs an empty [LinkedHashMap] instance.\n   */\n   constructor() : super() {\n   map = HashMap<K, ChainEntry<K, V>>()\n   }\n\n   internal constructor(backingMap: HashMap<K, Any>) : super() {\n   @Suppress(\"UNCHECKED_CAST\") // expected to work due to erasure\n   map = backingMap as HashMap<K, ChainEntry<K, V>>\n   }\n\n   /**\n   * Constructs an empty [LinkedHashMap] instance.\n   *\n   * @param initialCapacity the initial capacity (ignored)\n   * @param loadFactor   the load factor (ignored)\n   *\n   * @throws IllegalArgumentException if the initial capacity or load factor are negative\n   */\n   constructor(initialCapacity: Int, loadFactor: Float = 0f) : super(initialCapacity, loadFactor) {\n   map = HashMap<K, ChainEntry<K, V>>()\n   }\n\n   /**\n   * Constructs an instance of [LinkedHashMap] filled with the contents of the specified [original] map.\n   */\n   constructor(original: Map<out K, V>) {\n   map = HashMap<K, ChainEntry<K, V>>()\n   this.putAll(original)\n   }\n\n   override fun clear() {\n   map.clear()\n   head = null\n   }\n\n\n//   override fun clone(): Any {\n//   return LinkedHashMap(this)\n//   }\n\n   override fun containsKey(key: K): Boolean = map.containsKey(key)\n\n   override fun containsValue(value: V): Boolean {\n   var node: ChainEntry<K, V> = head ?: return false\n   do {\n   if (node.value == value) {\n   return true\n   }\n   node = node.next!!\n   } while (node !== head)\n   return false\n   }\n\n\n   override fun createEntrySet(): MutableSet<MutableMap.MutableEntry<K, V>> = EntrySet()\n\n   override operator fun get(key: K): V? = map.get(key)?.value\n\n   override fun put(key: K, value: V): V? {\n   val old = map.get(key)\n   if (old == null) {\n   val newEntry = ChainEntry(key, value)\n   map.put(key, newEntry)\n   newEntry.addToEnd()\n   return null\n   } else {\n   return old.setValue(value)\n   }\n   }\n\n   override fun remove(key: K): V? {\n   val entry = map.remove(key)\n   if (entry != null) {\n   entry.remove()\n   return entry.value\n   }\n   return null\n   }\n\n   override val size: Int get() = map.size\n}\n\n\n/**\n * Constructs the specialized implementation of [LinkedHashMap] with [String] keys, which stores the keys as properties of\n * JS object without hashing them.\n */\npublic fun <V> linkedStringMapOf(vararg pairs: Pair<String, V>): LinkedHashMap<String, V> {\n   return

LinkedHashMap<String, V>(stringMapOf<Any>()).apply { putAll(pairs) }\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n/*\n * Based on GWT LinkedHashSet\n * Copyright 2008 Google Inc.\n */\n\npackage kotlin.collections\n\n/**\n * The implementation of the [MutableSet] interface, backed by a [LinkedHashMap] instance.\n *\n * This implementation preserves the insertion order of elements during the iteration.\n */\npublic open class LinkedHashSet<E> : HashSet<E> {\n\n   internal constructor(map: LinkedHashMap<E, Any>) : super(map)\n\n   /**\n   * Constructs a new empty [LinkedHashSet].\n   */\n   constructor() : super(LinkedHashMap<E, Any>())\n\n   /**\n   * Constructs a new [LinkedHashSet] filled with the elements of the specified collection.\n   */\n   constructor(elements: Collection<E>) : super(LinkedHashMap<E, Any>()) {\n   addAll(elements)\n   }\n\n   /**\n   * Constructs a new empty [LinkedHashSet].\n   *\n   * @param initialCapacity the initial capacity (ignored)\n   * @param loadFactor   the load factor (ignored)\n   *\n   * @throws IllegalArgumentException if the initial capacity or load factor are negative\n   */\n   constructor(initialCapacity: Int, loadFactor: Float = 0.0f) : super(LinkedHashMap<E, Any>(initialCapacity, loadFactor))\n\n//   public override fun clone(): Any {\n//   return LinkedHashSet(this)\n//   }\n\n}\n\n/**\n * Creates a new instance of the specialized implementation of [LinkedHashSet] with the specified [String] elements,\n * which elements the keys as properties of JS object without hashing them.\n */\npublic fun linkedStringSetOf(vararg elements: String): LinkedHashSet<String> {\n   return LinkedHashSet(linkedStringMapOf<Any>()).apply { addAll(elements) }\n}\n","/*\n * Copyright 2010-2014 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin\n\n\n@Deprecated(\"Use Synchronized annotation from kotlin.jvm package\", ReplaceWith(\"kotlin.jvm.Synchronized\"), level = DeprecationLevel.WARNING)\npublic typealias Synchronized = kotlin.jvm.Synchronized\n@Deprecated(\"Use Volatile annotation from kotlin.jvm package\", ReplaceWith(\"kotlin.jvm.Volatile\"), level = DeprecationLevel.WARNING)\npublic typealias Volatile = kotlin.jvm.Volatile\n\n@kotlin.internal.InlineOnly\npublic inline fun <R> synchronized(@Suppress(\"UNUSED_PARAMETER\") lock: Any, block: () -> R): R = block()\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.io\n\nprivate abstract class BaseOutput {\n   open fun println() {\n   print(\"\\n\")\n   }\n\n   open fun println(message: Any?) {\n   print(message)\n   println()\n   }\n\n   abstract fun print(message: Any?)\n\n   open fun flush() {}\n}\n\n/** JsName used to make the declaration available outside of module to test it */\n@JsName(\"NodeJsOutput\")\nprivate class NodeJsOutput(val outputStream: dynamic) : BaseOutput() {\n   override fun print(message: Any?) = outputStream.write(String(message))\n}\n\n/** JsName used to make the declaration available outside of module to test it */\n@JsName(\"OutputToConsoleLog\")\nprivate class OutputToConsoleLog : BaseOutput() {\n   override fun print(message: Any?) {\n   console.log(message)\n   }\n\n   override fun println(message: Any?) {\n   console.log(message)\n   }\n\n   override fun println() {\n

console.log(\"\")\n   }\n}\n\n/** JsName used to make the declaration available outside of module to test it and use at try.kotl.in */\n@JsName(\"BufferedOutput\")\nprivate open class BufferedOutput : BaseOutput() {\n   var buffer = \"\"\n\n   override fun print(message: Any?) {\n   buffer += String(message)\n   }\n\n   override fun flush() {\n   buffer = \"\"\n   }\n}\n\n/** JsName used to make the declaration available outside of module to test it */\n@JsName(\"BufferedOutputToConsoleLog\")\nprivate class BufferedOutputToConsoleLog : BufferedOutput() {\n   override fun print(message: Any?) {\n   var s = String(message)\n   val i = s.lastIndexOf('\\n')\n   if (i >= 0) {\n   buffer += s.substring(0, i)\n   flush()\n   s = s.substring(i + 1)\n   }\n   buffer += s\n   }\n\n   override fun flush() {\n   console.log(buffer)\n   buffer = \"\"\n   }\n}\n\n/** JsName used to make the declaration available outside of module to test it and use at try.kotl.in */\n@JsName(\"output\")\nprivate var output = run {\n   val isNode: Boolean = js(\"typeof process !== 'undefined' && process.versions && !!process.versions.node\")\n   if (isNode) NodeJsOutput(js(\"process.stdout\")) else BufferedOutputToConsoleLog()\n}\n\n@kotlin.internal.InlineOnly\nprivate inline fun String(value: Any?): String = js(\"String\")(value)\n\n/** Prints a newline to the standard output stream. */\npublic fun println() {\n   output.println()\n}\n\n/** Prints the given message and newline to the standard output stream. */\npublic fun println(message: Any?) {\n   output.println(message)\n}\n\n/** Prints the given message to the standard output stream. */\npublic fun print(message: Any?) {\n   output.print(message)\n}","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental\nimport kotlin.coroutines.experimental.intrinsics.*\n\n@JsName(\"CoroutineImpl\")\ninternal abstract class CoroutineImpl(private val resultContinuation: Continuation<Any?>) : Continuation<Any?> {\n   protected var state = 0\n   protected var exceptionState = 0\n   protected var result: Any? = null\n   protected var exception: Throwable? = null\n   protected var finallyPath: Array<Int>? = null\n\n   public override val context: CoroutineContext = resultContinuation.context\n\n   val facade: Continuation<Any?> = context[ContinuationInterceptor]?.interceptContinuation(this) ?: this\n\n   override fun resume(value: Any?) {\n   result = value\n   doResumeWrapper()\n   }\n\n   override fun resumeWithException(exception: Throwable) {\n   state = exceptionState\n   this.exception = exception\n   doResumeWrapper()\n   }\n\n   protected fun doResumeWrapper() {\n   processBareContinuationResume(resultContinuation) { doResume() }\n   }\n\n   protected abstract fun doResume(): Any?\n}\n\nprivate val UNDECIDED: Any? = Any()\nprivate val RESUMED: Any? = Any()\nprivate class Fail(val exception: Throwable)\n\n@PublishedApi\ninternal class SafeContinuation<in T>\ninternal constructor(\n   private val delegate: Continuation<T>,\n   initialResult: Any?) : Continuation<T> {\n\n   @PublishedApi\n   internal constructor(delegate: Continuation<T>) : this(delegate, UNDECIDED)\n\n   public override val context: CoroutineContext\n   get() = delegate.context\n\n   private var result: Any? = initialResult\n\n   override fun resume(value: T) {\n   when {\n   result === UNDECIDED -> {\n   result = value\n   }\n   result === COROUTINE_SUSPENDED -> {\n   result = RESUMED\n   delegate.resume(value)\n   }\n   else -> {\n   throw IllegalStateException(\"Already resumed\")\n   }\n   }\n   }\n\n   override fun resumeWithException(exception: Throwable) {\n   when {\n   result === UNDECIDED -> {\n   result = Fail(exception)\n   }\n   result === COROUTINE_SUSPENDED -> {\n   result = RESUMED\n   delegate.resumeWithException(exception)\n   }\n   else -> {\n   throw IllegalStateException(\"Already resumed\")\n   }\n   }\n   }\n\n   @PublishedApi\n   internal fun getResult(): Any? {\n   if (result === UNDECIDED) {\n   result = COROUTINE_SUSPENDED\n   }\n   val result = this.result\n   return when {\n   result === RESUMED -> {\n   COROUTINE_SUSPENDED // already called continuation, indicate SUSPENDED upstream\n   }\n

result is Fail -> {\n   throw result.exception\n   }\n   else -> {\n   result // either SUSPENDED or data\n   }\n   }\n   }\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.coroutines.experimental.intrinsics\n\nimport kotlin.coroutines.experimental.Continuation\n\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> (suspend () -> T).startCoroutineUninterceptedOrReturn(\n   completion: Continuation<T>\n): Any? = this.asDynamic()(completion, false)\n\n@SinceKotlin(\"1.1\")\n@Suppress(\"UNCHECKED_CAST\")\n@kotlin.internal.InlineOnly\npublic inline fun <R, T> (suspend R.() -> T).startCoroutineUninterceptedOrReturn(\n   receiver: R,\n   completion: Continuation<T>\n): Any? = this.asDynamic()(receiver, completion, false)\n\n@SinceKotlin(\"1.1\")\npublic fun <R, T> (suspend R.() -> T).createCoroutineUnchecked(\n   receiver: R,\n   completion: Continuation<T>\n): Continuation<Unit> = this.asDynamic()(receiver, completion, true).facade\n\n@SinceKotlin(\"1.1\")\npublic fun <T> (suspend () -> T).createCoroutineUnchecked(\n   completion: Continuation<T>\n): Continuation<Unit> = this.asDynamic()(completion, true).facade\n","package kotlin.js\n\n/**\n * Exposes the [Date API](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Date) to Kotlin.\n */\npublic external class Date() {\n   public constructor(milliseconds: Number)\n\n   public constructor(dateString: String)\n\n   public constructor(year: Int, month: Int)\n\n   public constructor(year: Int, month: Int, day: Int)\n\n   public constructor(year: Int, month: Int, day: Int, hour: Int)\n\n   public constructor(year: Int, month: Int, day: Int, hour: Int, minute: Int)\n\n   public constructor(year: Int, month: Int, day: Int, hour: Int, minute: Int, second: Int)\n\n   public constructor(year: Int, month: Int, day: Int, hour: Int, minute: Int, second: Int, millisecond: Number)\n\n   public fun getDate(): Int\n\n   public fun getDay(): Int\n\n   public fun getFullYear(): Int\n\n   public fun getHours(): Int\n\n   public fun getMilliseconds(): Int\n\n   public fun getMinutes(): Int\n\n   public fun getMonth(): Int\n\n   public fun getSeconds(): Int\n\n   public fun getTime(): Double\n\n   public fun getTimezoneOffset(): Int\n\n   public fun getUTCDate(): Int\n\n   public fun getUTCDay(): Int\n\n   public fun getUTCFullYear(): Int\n\n   public fun getUTCHours(): Int\n\n   public fun getUTCMilliseconds(): Int\n\n   public fun getUTCMinutes(): Int\n\n   public fun getUTCMonth(): Int\n\n   public fun getUTCSeconds(): Int\n\n   public fun toDateString(): String\n\n   public fun toISOString(): String\n\n   public fun toJSON(): Json\n\n   public fun toLocaleDateString(locales: Array<String> = definedExternally, options: LocaleOptions = definedExternally): String\n\n   public fun toLocaleDateString(locales: String, options: LocaleOptions = definedExternally): String\n\n   public fun toLocaleString(locales: Array<String> = definedExternally, options: LocaleOptions = definedExternally): String\n\n   public fun toLocaleString(locales: String, options: LocaleOptions = definedExternally): String\n\n   public fun toLocaleTimeString(locales: Array<String> = definedExternally, options: LocaleOptions = definedExternally): String\n\n   public fun toLocaleTimeString(locales: String, options: LocaleOptions = definedExternally): String\n\n   public fun toTimeString(): String\n\n   public fun toUTCString(): String\n\n   public companion object {\n   public fun now(): Double\n\n   public fun parse(dateString: String): Double\n\n   public fun UTC(year: Int, month: Int): Double\n\n   public fun UTC(year: Int, month: Int, day: Int): Double\n\n   public fun UTC(year: Int, month: Int, day: Int, hour: Int): Double\n\n   public fun UTC(year: Int, month: Int, day: Int, hour: Int, minute: Int): Double\n\n   public fun UTC(year: Int, month: Int, day: Int, hour: Int, minute: Int, second: Int): Double\n\n   public fun UTC(year: Int, month: Int, day: Int, hour: Int, minute: Int, second: Int, millisecond: Number): Double\n   }\n\n   public interface LocaleOptions {\n   public var localeMatcher: String?\n\n   public var timeZone: String?\n\n   public var hour12: Boolean?\n\n   public var formatMatcher: String?\n\n   public var weekday: String?\n\n   public var era: String?\n\n   public var year: String?\n\n   public var month: String?\n\n   public var day: String?\n\n   public var hour: String?\n\n   public var minute: String?\n\n   public var second: String?\n\n   public var timeZoneName: String?\n

}\n}\n\npublic inline fun dateLocaleOptions(init: Date.LocaleOptions.() -> Unit): Date.LocaleOptions {\n   val result = js(\"new Object()\").unsafeCast<Date.LocaleOptions>()\n   init(result)\n   return result\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.dom\n\nimport org.w3c.dom.*\n\n/**\n * Creates a new element with the specified [name].\n *\n * The element is initialized with the speicifed [init] function.\n */\npublic fun Document.createElement(name: String, init: Element.() -> Unit): Element = createElement(name).apply(init)\n\n/**\n * Appends a newly created element with the specified [name] to this element.\n *\n * The element is initialized with the speicifed [init] function.\n */\npublic fun Element.appendElement(name: String, init: Element.() -> Unit): Element =\n ownerDocument!!.createElement(name, init).also { appendChild(it) }\n\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.dom\n\nimport org.w3c.dom.*\n\n/** Returns true if the element has the given CSS class style in its 'class' attribute */\nfun Element.hasClass(cssClass: String): Boolean = className.matches(\"\"\"(^|.*\\s+)$cssClass($|\\s+.*)\"\"\".toRegex())\n\n/**\n * Adds CSS class to element. Has no effect if all specified classes are already in class attribute of the element\n *\n * @return true if at least one class has been added\n */\nfun Element.addClass(vararg cssClasses: String): Boolean {\n   val missingClasses = cssClasses.filterNot { hasClass(it) }\n   if (missingClasses.isNotEmpty()) {\n   val presentClasses = className.trim()\n   className = buildString {\n   append(presentClasses)\n   if (!presentClasses.isEmpty()) {\n   append(\" \")\n   }\n   missingClasses.joinTo(this, \" \")\n   }\n   return true\n   }\n\n   return false\n}\n\n/**\n * Removes all [cssClasses] from element. Has no effect if all specified classes are missing in class attribute of the element\n *\n * @return true if at least one class has been removed\n */\nfun Element.removeClass(vararg cssClasses: String): Boolean {\n   if (cssClasses.any { hasClass(it) }) {\n   val toBeRemoved = cssClasses.toSet()\n   className = className.trim().split(\"\\\\s+\".toRegex()).filter { it !in toBeRemoved }.joinToString(\" \")\n   return true\n   }\n\n   return false\n}\n","/*\n * Copyright 2010-2015 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\npackage kotlin.dom\n\nimport org.w3c.dom.*\nimport kotlin.collections.*\n\n/**\n * Gets a value indicating whether this node is a TEXT_NODE or a CDATA_SECTION_NODE.\n */\npublic val Node.isText: Boolean\n   get() = nodeType == Node.TEXT_NODE || nodeType == Node.CDATA_SECTION_NODE\n\n/**\n * Gets a value indicating whether this node is an [Element].\n */\npublic val Node.isElement: Boolean\n   get() = nodeType == Node.ELEMENT_NODE\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the

License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage org.w3c.dom.events\n\npublic fun EventListener(handler: (Event) -> Unit): EventListener = EventListenerHandler(handler)\n\nprivate class EventListenerHandler(private val handler: (Event) -> Unit) : EventListener {\n   public override fun handleEvent(e: Event) {\n   handler(e)\n   }\n   public override fun toString(): String = \"EventListenerHandler($handler)\"\n}\n","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage org.w3c.dom\n\npublic external interface ItemArrayLike<out T> {\n   val length: Int\n   fun item(index: Int): T?\n}\n\n/**\n * Returns the view of this `ItemArrayLike<T>` collection as `List<T>`\n */\npublic fun <T> ItemArrayLike<T>.asList(): List<T> = object : AbstractList<T>() {\n   override val size: Int get() = this@asList.length\n\n   override fun get(index: Int): T = when (index) {\n   in 0..lastIndex -> this@asList.item(index).unsafeCast<T>()\n   else -> throw IndexOutOfBoundsException(\"index $index is not in range [0..$lastIndex]\")\n   }\n}","package kotlin.dom\n\nimport org.w3c.dom.*\n\n/** Removes all the children from this node. */\npublic fun Node.clear() {\n   while (hasChildNodes()) {\n   removeChild(firstChild!!)\n   }\n}\n\n/**\n * Creates text node and append it to the element.\n *\n * @returns this element\n */\nfun Element.appendText(text: String): Element {\n   appendChild(ownerDocument!!.createTextNode(text))\n   return this\n}\n","/*\n * Copyright 2010-2014 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.js\n\n/**\n * Reinterprets this value as a value of the [dynamic type](/docs/reference/dynamic-type.html).\n */\n@kotlin.internal.InlineOnly\npublic inline fun Any?.asDynamic(): dynamic = this\n\n/**\n * Reinterprets this value as a value of the specified type [T] without any actual type checking.\n */\n@kotlin.internal.InlineOnly\npublic inline fun <T> Any?.unsafeCast(): @kotlin.internal.NoInfer T = this.asDynamic()\n\n/**\n * Reinterprets this `dynamic` value as a value of the specified type [T] without any actual type checking.\n */\n@kotlin.internal.DynamicExtension\n@JsName(\"unsafeCastDynamic\")\n@kotlin.internal.InlineOnly\npublic inline fun <T> dynamic.unsafeCast(): @kotlin.internal.NoInfer T = this\n\n/**\n * Allows to iterate this `dynamic` object in the following cases:\n * - when it has an `iterator` function,\n * - when it is an array\n * - when it is an instance of [kotlin.collections.Iterable]\n */\n@kotlin.internal.DynamicExtension\npublic operator fun dynamic.iterator(): Iterator<dynamic> {\n   val r: Any? = this\n\n   return when {\n   this[\"iterator\"] != null ->\n   this[\"iterator\"]()\n   js(\"Kotlin\").isArrayish(r) ->\n   r.unsafeCast<Array<*>>().iterator()\n\n   else ->\n   (r as Iterable<*>).iterator()\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\n// a package is omitted to get declarations directly under the module\n\n@JsName(\"throwNPE\")\nprivate fun throwNPE(message: String) {\n   throw NullPointerException(message)\n}\n\n@JsName(\"throwCCE\")\nprivate fun throwCCE() {\n   throw ClassCastException(\"Illegal cast\")\n}\n\n@JsName(\"throwISE\")\nprivate fun throwISE(message: String) {\n

throw IllegalStateException(message)\n}\n\n@JsName(\"throwUPAE\")\nprivate fun throwUPAE(propertyName: String) {\n   throw UninitializedPropertyAccessException(\"lateinit property ${propertyName} has not been initialized\")\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin\n\n// NOTE: Do not author your exceptions as they are written in this file, instead use this template:\n/*\npublic open class MyException : Exception {\n   constructor() : super()\n   constructor(message: String?) : super(message)\n   constructor(message: String?, cause: Throwable?) : super(message, cause)\n   constructor(cause: Throwable?) : super(cause)\n}\n*/\n\n\n// TODO: remove workarounds for KT-22053 from direct Throwable inheritors\n// TODO: remove primary constructors, make all secondary KT-22055\n\n@Suppress(\"USELESS_ELVIS_RIGHT_IS_NULL\")\npublic open class Error(message: String?, cause: Throwable?) : Throwable(message, cause ?: null) {\n   constructor() : this(null, null) {\n   Error::class.js.asDynamic().call(this, null, null)\n   }\n\n   constructor(message: String?) : this(message, null) {\n   Error::class.js.asDynamic().call(this, message, null)\n   }\n\n   constructor(cause: Throwable?) : this(undefined, cause) {\n   Error::class.js.asDynamic().call(this, undefined, cause)\n   }\n}\n\n@Suppress(\"USELESS_ELVIS_RIGHT_IS_NULL\")\npublic open class Exception(message: String?, cause: Throwable?) : Throwable(message, cause ?: null) {\n   constructor() : this(null, null) {\n   Exception::class.js.asDynamic().call(this, null, null)\n   }\n\n   constructor(message: String?) : this(message, null) {\n   Exception::class.js.asDynamic().call(this, message, null)\n   }\n\n   constructor(cause: Throwable?) : this(undefined, cause) {\n   Exception::class.js.asDynamic().call(this, undefined, cause)\n   }\n}\n\npublic open class RuntimeException(message: String?, cause: Throwable?) : Exception(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\npublic open class IllegalArgumentException(message: String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\npublic open class IllegalStateException(message: String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\npublic open class IndexOutOfBoundsException(message: String?) : RuntimeException(message) {\n   constructor() : this(null)\n}\n\npublic open class ConcurrentModificationException(message: String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\npublic open class UnsupportedOperationException(message: String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\n\npublic open class NumberFormatException(message: String?) : IllegalArgumentException(message) {\n   constructor() : this(null)\n}\n\n\npublic open class NullPointerException(message: String?) : RuntimeException(message) {\n   constructor() : this(null)\n}\n\npublic open class ClassCastException(message: String?) : RuntimeException(message) {\n   constructor() : this(null)\n}\n\npublic open class AssertionError private constructor(message: String?, cause: Throwable?) : Error(message, cause) {\n   constructor() : this(null)\n   constructor(message: String?) : this(message, null)\n   constructor(message: Any?) : this(message.toString(), message as? Throwable)\n}\n\npublic open class NoSuchElementException(message: String?) : RuntimeException(message) {\n   constructor() : this(null)\n}\n\n\npublic open class NoWhenBranchMatchedException(message: String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n\npublic open class UninitializedPropertyAccessException(message:

String?, cause: Throwable?) : RuntimeException(message, cause) {\n   constructor() : this(null, null)\n   constructor(message: String?) : this(message, null)\n   constructor(cause: Throwable?) : this(undefined, cause)\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\npackage kotlin.collections\n\n/**\n * Groups elements from the [Grouping] source by key and counts elements in each group.\n *\n * @return a [Map] associating the key of each group with the count of element in the group.\n */\n@SinceKotlin(\"1.1\")\npublic fun <T, K> Grouping<T, K>.eachCount(): Map<K, Int> =\n   fold(0) { acc, _ -> acc + 1 }\n\n/**\n/**\n * Groups elements from the [Grouping] source by key and sums values provided by the [valueSelector] function for elements in each group.\n *\n * @return a [Map] associating the key of each group with the count of element in the group.\n */\n@SinceKotlin(\"1.1\")\npublic inline fun <T, K> Grouping<T, K>.eachSumOf(valueSelector: (T) -> Int): Map<K, Int> =\n   fold(0) { acc, e -> acc + valueSelector(e) }\n*/","package kotlin.js\n\n/**\n * Exposes the JavaScript [Math object](https://developer.mozilla.org/en/docs/Web/JavaScript/Reference/Global_Objects/Math) to Kotlin.\n */\n@Deprecated(\"Use top-level functions from kotlin.math package instead.\")\npublic external object Math {\n   @Deprecated(\"Use kotlin.math.PI instead.\", ReplaceWith(\"PI\", \"kotlin.math.PI\"))\n   public val PI: Double\n   public fun random(): Double\n   @Deprecated(\"Use kotlin.math.abs instead.\", ReplaceWith(\"abs(value)\", \"kotlin.math.abs\"))\n   public fun abs(value: Double): Double\n   @Deprecated(\"Use kotlin.math.acos instead.\", ReplaceWith(\"acos(value)\", \"kotlin.math.acos\"))\n   public fun acos(value: Double): Double\n   @Deprecated(\"Use kotlin.math.asin instead.\", ReplaceWith(\"asin(value)\", \"kotlin.math.asin\"))\n   public fun asin(value: Double): Double\n   @Deprecated(\"Use kotlin.math.atan instead.\", ReplaceWith(\"atan(value)\", \"kotlin.math.atan\"))\n   public fun atan(value: Double): Double\n   @Deprecated(\"Use kotlin.math.atan2 instead.\", ReplaceWith(\"atan2(y, x)\", \"kotlin.math.atan2\"))\n   public fun atan2(y: Double, x: Double): Double\n   @Deprecated(\"Use kotlin.math.cos instead.\", ReplaceWith(\"cos(value)\", \"kotlin.math.cos\"))\n   public fun cos(value: Double): Double\n   @Deprecated(\"Use kotlin.math.sin instead.\", ReplaceWith(\"sin(value)\", \"kotlin.math.sin\"))\n   public fun sin(value: Double): Double\n   @Deprecated(\"Use kotlin.math.exp instead.\", ReplaceWith(\"exp(value)\", \"kotlin.math.exp\"))\n   public fun exp(value: Double): Double\n   @Deprecated(\"Use maxOf or kotlin.math.max instead\")\n   public fun max(vararg values: Int): Int\n   @Deprecated(\"Use maxOf or kotlin.math.max instead\")\n   public fun max(vararg values: Float): Float\n   @Deprecated(\"Use maxOf or kotlin.math.max instead\")\n   public fun max(vararg values: Double): Double\n   @Deprecated(\"Use minOf or kotlin.math.min instead\")\n   public fun min(vararg values: Int): Int\n   @Deprecated(\"Use minOf or kotlin.math.min instead\")\n   public fun min(vararg values: Float): Float\n   @Deprecated(\"Use minOf or kotlin.math.min instead\")\n   public fun min(vararg values: Double): Double\n   @Deprecated(\"Use kotlin.math.sqrt instead.\", ReplaceWith(\"sqrt(value)\", \"kotlin.math.sqrt\"))\n   public fun sqrt(value: Double): Double\n   @Deprecated(\"Use kotlin.math.tan instead.\", ReplaceWith(\"tan(value)\", \"kotlin.math.tan\"))\n   public fun tan(value: Double): Double\n   @Deprecated(\"Use kotlin.math.log instead.\", ReplaceWith(\"log(value)\", \"kotlin.math.log\"))\n   public fun log(value: Double): Double\n   @Deprecated(\"Use kotlin.math.pow instead.\", ReplaceWith(\"pow(base, exp)\", \"kotlin.math.pow\"))\n   public fun pow(base: Double, exp: Double): Double\n   @Deprecated(\"Use kotlin.math.round instead.\", ReplaceWith(\"round(value)\", \"kotlin.math.round\"))\n   public fun round(value: Number): Int\n   @Deprecated(\"Use kotlin.math.floor instead.\", ReplaceWith(\"floor(value)\", \"kotlin.math.floor\"))\n   public fun floor(value: Number): Int\n   @Deprecated(\"Use kotlin.math.ceil instead.\", ReplaceWith(\"ceil(value)\", \"kotlin.math.ceil\"))\n   public fun ceil(value: Number): Int\n\n   @PublishedApi\n   internal fun trunc(value: Number): Double\n   @PublishedApi\n   internal fun sign(value: Number): Double\n\n   @PublishedApi\n   internal fun sinh(value: Double): Double\n   @PublishedApi\n   internal fun cosh(value: Double): Double\n   @PublishedApi\n   internal fun tanh(value:

Double): Double\n   @PublishedApi\n   internal fun asinh(value: Double): Double\n   @PublishedApi\n   internal fun acosh(value: Double): Double\n   @PublishedApi\n   internal fun atanh(value: Double): Double\n\n @PublishedApi\n   internal fun hypot(x: Double, y: Double): Double\n\n   @PublishedApi\n   internal fun expm1(value: Double): Double\n\n   @PublishedApi\n   internal fun log10(value: Double): Double\n   @PublishedApi\n   internal fun log2(value: Double): Double\n   @PublishedApi\n   internal fun log1p(value: Double): Double\n}\n\n/**\n * Returns the smaller of two values.\n */\n@Suppress(\"DEPRECATION\")\n@Deprecated(\"Use minOf or kotlin.math.min instead\", ReplaceWith(\"minOf(a, b)\"))\npublic fun Math.min(a: Long, b: Long): Long = if (a <= b) a else b\n\n/**\n * Returns the greater of two values.\n */\n@Suppress(\"DEPRECATION\")\n@Deprecated(\"Use maxOf or kotlin.math.max instead\", ReplaceWith(\"maxOf(a, b)\"))\npublic fun Math.max(a: Long, b: Long): Long = if (a >= b) a else b\n","package kotlin.js\n\n/**\n * An interface for indexing access to a collection of key-value pairs, where type of key is [String] and type of value is [Any?][Any].\n */\npublic external interface Json {\n   /**\n   * Calls to the function will be translated to indexing operation (square brackets) on the receiver with [propertyName] as the argument.\n   *\n   * E.g. for next code:\n   * ```kotlin\n   * fun test(j: Json, p: String) = j[\"prop\"] + j.get(p)\n   * ```\n   *\n   * will be generated:\n   * ```js\n   * function test(j, p) {\n   *   return j[\"prop\"] + j[p];\n   * }\n   * ```\n   */\n   operator fun get(propertyName: String): Any?\n\n   /**\n   * Calls of the function will be translated to an assignment of [value] to the receiver indexed (with square brackets/index operation) with [propertyName].\n   *\n   * E.g. for the following code:\n   * ```kotlin\n   * fun test(j: Json, p: String, newValue: Any) {\n   *   j[\"prop\"] = 1\n   *   j.set(p, newValue)\n   * }\n   * ```\n   *\n   * will be generated:\n   * ```js\n   * function test(j, p, newValue) {\n   *   j[\"prop\"] = 1;\n   *   j[p] = newValue;\n   * }\n   * ```\n   */\n   operator fun set(propertyName: String, value: Any?): Unit\n}\n\n/**\n * Returns a simple JavaScript object (as [Json]) using provided key-value pairs as names and values of its properties.\n */\npublic fun json(vararg pairs: Pair<String, Any?>): Json {\n   val res: dynamic = js(\"({})\")\n   for ((name, value) in pairs) {\n   res[name] = value\n   }\n   return res\n}\n\n/**\n * Adds key-value pairs from [other] to [this].\n * Returns the original receiver.\n */\npublic fun Json.add(other: Json): Json {\n   val keys: Array<String> = js(\"Object\").keys(other)\n   for (key in keys) {\n   if (other.asDynamic().hasOwnProperty(key)) {\n   this[key] = other[key];\n   }\n   }\n   return this\n}\n\n/**\n * Exposes the JavaScript [JSON object](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/JSON) to Kotlin.\n */\npublic external object JSON {\n   public fun stringify(o: Any?): String\n   public fun stringify(o: Any?, replacer: ((key: String, value: Any?) -> Any?)): String\n   public fun stringify(o: Any?, replacer: ((key: String, value: Any?) -> Any?)? = definedExternally, space: Int): String\n   public fun stringify(o: Any?, replacer: ((key: String, value: Any?) -> Any?)? = definedExternally, space: String): String\n   public fun stringify(o: Any?, replacer: Array<String>): String\n   public fun stringify(o: Any?, replacer: Array<String>, space: Int): String\n   public fun stringify(o: Any?, replacer: Array<String>, space: String): String\n\n   public fun <T> parse(text: String): T\n   public fun <T> parse(text: String, reviver: ((key: String, value: Any?) -> Any?)): T\n}\n","package kotlin\n\n/**\n * Returns `true` if the specified number is a\n * Not-a-Number (NaN) value, `false` otherwise.\n */\npublic fun Double.isNaN(): Boolean = this != this\n\n/**\n * Returns `true` if the specified number is a\n * Not-a-Number (NaN) value, `false` otherwise.\n */\npublic fun Float.isNaN(): Boolean = this != this\n\n/**\n * Returns `true` if this value is infinitely large in magnitude.\n */\npublic fun Double.isInfinite(): Boolean = this == Double.POSITIVE_INFINITY || this == Double.NEGATIVE_INFINITY\n\n/**\n * Returns `true` if this value is infinitely large in magnitude.\n */\npublic fun Float.isInfinite(): Boolean = this == Float.POSITIVE_INFINITY || this == Float.NEGATIVE_INFINITY\n\n/**\n * Returns `true` if the argument is a finite floating-point value; returns `false` otherwise (for `NaN` and infinity arguments).\n */\npublic fun Double.isFinite(): Boolean = !isInfinite() && !isNaN()\n\n/**\n * Returns `true` if the argument is a finite floating-point value; returns `false` otherwise (for `NaN` and infinity arguments).\n */\npublic fun Float.isFinite(): Boolean = !isInfinite() && !isNaN()\n\n/**\n * Returns a bit representation of the specified floating-point value as [Long]\n * according to the IEEE 754 floating-point \"double format\" bit layout.\n */\n@SinceKotlin(\"1.2\")\n@library(\"doubleToBits\")\npublic fun Double.toBits(): Long =

definedExternally\n\n/**\n * Returns a bit representation of the specified floating-point value as [Long]\n * according to the IEEE 754 floating-point \"double format\" bit layout,\n * preserving `NaN` values exact layout.\n */\n@SinceKotlin(\"1.2\")\n@library(\"doubleToRawBits\")\npublic fun Double.toRawBits(): Long = definedExternally\n\n/**\n * Returns the [Double] value corresponding to a given bit representation.\n */\n@SinceKotlin(\"1.2\")\n@kotlin.internal.InlineOnly\npublic inline fun Double.Companion.fromBits(bits: Long): Double = js(\"Kotlin\").doubleFromBits(bits).unsafeCast<Double>()\n\n/**\n * Returns a bit representation of the specified floating-point value as [Int]\n * according to the IEEE 754 floating-point \"single format\" bit layout.\n *\n * Note that in Kotlin/JS [Float] range is wider than \"single format\" bit layout can represent,\n * so some [Float] values may overflow, underflow or loose their accuracy after conversion to bits and back.\n */\n@SinceKotlin(\"1.2\")\n@library(\"floatToBits\")\npublic fun Float.toBits(): Int = definedExternally\n\n/**\n * Returns a bit representation of the specified floating-point value as [Int]\n * according to the IEEE 754 floating-point \"single format\" bit layout,\n * preserving `NaN` values exact layout.\n *\n * Note that in Kotlin/JS [Float] range is wider than \"single format\" bit layout can represent,\n * so some [Float] values may overflow, underflow or loose their accuracy after conversion to bits and back.\n */\n@SinceKotlin(\"1.2\")\n@library(\"floatToRawBits\")\npublic fun Float.toRawBits(): Int = definedExternally\n\n/**\n * Returns the [Float] value corresponding to a given bit representation.\n */\n@SinceKotlin(\"1.2\")\n@kotlin.internal.InlineOnly\npublic inline fun Float.Companion.fromBits(bits: Int): Float = js(\"Kotlin\").floatFromBits(bits).unsafeCast<Float>()","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.text\n\n\n/**\n * Returns `true` if the contents of this string is equal to the word \"true\", ignoring case, and `false` otherwise.\n */\npublic fun String.toBoolean(): Boolean = toLowerCase() == \"true\"\n\n/**\n * Parses the string as a signed [Byte] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n */\npublic fun String.toByte(): Byte = toByteOrNull() ?: numberFormatError(this)\n\n/**\n * Parses the string as a signed [Byte] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n */\npublic fun String.toByte(radix: Int): Byte = toByteOrNull(radix) ?: numberFormatError(this)\n\n\n/**\n * Parses the string as a [Short] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n */\npublic fun String.toShort(): Short = toShortOrNull() ?: numberFormatError(this)\n\n/**\n * Parses the string as a [Short] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n */\npublic fun String.toShort(radix: Int): Short = toShortOrNull(radix) ?: numberFormatError(this)\n\n/**\n * Parses the string as an [Int] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n */\npublic fun String.toInt(): Int = toIntOrNull() ?: numberFormatError(this)\n\n/**\n * Parses the string as an [Int] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n */\npublic fun String.toInt(radix: Int): Int = toIntOrNull(radix) ?: numberFormatError(this)\n\n/**\n * Parses the string as a [Long] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n */\npublic fun String.toLong(): Long = toLongOrNull() ?: numberFormatError(this)\n\n/**\n * Parses the string as a [Long] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n * @throws IllegalArgumentException when [radix] is not a valid radix for string to number conversion.\n */\npublic fun String.toLong(radix: Int): Long = toLongOrNull(radix) ?: numberFormatError(this)\n\n/**\n * Parses the string as a

[Double] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n *\npublic fun String.toDouble(): Double = (+(this.asDynamic())).unsafeCast<Double>().also {\n   if (it.isNaN() && !this.isNaN() || it == 0.0 && this.isBlank())\n   numberFormatError(this)\n}\n\n/**\n * Parses the string as a [Float] number and returns the result.\n * @throws NumberFormatException if the string is not a valid representation of a number.\n *\n@kotlin.internal.InlineOnly\npublic inline fun String.toFloat(): Float = toDouble().unsafeCast<Float>()\n\n/**\n * Parses the string as a [Double] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\npublic fun String.toDoubleOrNull(): Double? = (+(this.asDynamic())).unsafeCast<Double>().takeIf {\n   !(it.isNaN() && !this.isNaN() || it == 0.0 && this.isBlank())\n}\n\n/**\n * Parses the string as a [Float] number and returns the result\n * or `null` if the string is not a valid representation of a number.\n *\n@kotlin.internal.InlineOnly\npublic inline fun String.toFloatOrNull(): Float? = toDoubleOrNull().unsafeCast<Float?>()\n\nprivate fun String.isNaN(): Boolean = when(this.toLowerCase()) {\n   \"nan\", \"+nan\", \"-nan\" -> true\n   else -> false\n}\n\n/**\n * Checks whether the given [radix] is valid radix for string to number and number to string conversion.\n *\n@PublishedApi\ninternal fun checkRadix(radix: Int): Int {\n   if(radix !in 2..36) {\n   throw IllegalArgumentException(\"radix $radix was not in valid range 2..36\")\n   }\n   return radix\n}\n\ninternal fun digitOf(char: Char, radix: Int): Int = when {\n   char >= '0' && char <= '9' -> char - '0'\n   char >= 'A' && char <= 'Z' -> char - 'A' + 10\n   char >= 'a' && char <= 'z' -> char - 'a' + 10\n   else -> -1\n}.let { if (it >= radix) -1 else it }\n\nprivate fun numberFormatError(input: String): Nothing = throw NumberFormatException(\"Invalid number format: '$input'\")","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\npackage kotlin.js\n\nimport kotlin.internal.LowPriorityInOverloadResolution\n\n/**\n * Exposes the JavaScript [Promise object](https://developer.mozilla.org/en/docs/Web/JavaScript/Reference/Global_Objects/Promise) to Kotlin.\n *\npublic open external class Promise<out T>(executor: (resolve: (T) -> Unit, reject: (Throwable) -> Unit) -> Unit) {\n   @LowPriorityInOverloadResolution\n   public open fun <S> then(onFulfilled: ((T) -> S)?): Promise<S>\n   @LowPriorityInOverloadResolution\n   public open fun <S> then(onFulfilled: ((T) -> S)?, onRejected: ((Throwable) -> S)?): Promise<S>\n\n   public open fun <S> catch(onRejected: (Throwable) -> S): Promise<S>\n\n   companion object {\n   public fun <S> all(promise: Array<out Promise<S>>): Promise<Array<out S>>\n\n   public fun <S> race(promise: Array<out Promise<S>>): Promise<S>\n\n   public fun reject(e: Throwable): Promise<Nothing>\n\n   public fun <S> resolve(e: S): Promise<S>\n   public fun <S> resolve(e: Promise<S>): Promise<S>\n   }\n}\n\n// It's workaround for KT-19672 since we can fix it properly until KT-11265 isn't fixed.\ninline fun <T, S> Promise<Promise<T>>.then(\n   noinline onFulfilled: ((T) -> S)?\n): Promise<S> {\n   return this.unsafeCast<Promise<T>>().then(onFulfilled)\n}\n\ninline fun <T, S> Promise<Promise<T>>.then(\n   noinline onFulfilled: ((T) -> S)?,\n   noinline onRejected: ((Throwable) -> S)?\n): Promise<S> {\n   return this.unsafeCast<Promise<T>>().then(onFulfilled, onRejected)\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n *\npackage kotlin.js\n\nimport getKClass\nimport kotlin.reflect.KClass\nimport kotlin.reflect.js.internal.KClassImpl\n\n/**\n * Represents the constructor of a class. Instances of `JsClass` can be passed to JavaScript APIs that expect a constructor reference.\n *\nexternal interface JsClass<T : Any> {\n   /**\n   * Returns the unqualified name of the class represented by this instance.\n   *\n

val name: String\n}\n\n@Deprecated(\"Use class literal and extension property `js` instead.\", replaceWith = ReplaceWith(\"T::class.js\"), level = DeprecationLevel.WARNING)\nexternal fun <T : Any> jsClass(): JsClass<T>\n\n@Deprecated(\"Use class literal and extension property `js` instead.\", replaceWith = ReplaceWith(\"this::class.js\"), level = DeprecationLevel.WARNING)\nval <T : Any> T.jsClass: JsClass<T>\n get() = when (jsTypeOf(this)) {\n   \"string\" -> js(\"String\")\n   \"number\" -> js(\"Number\")\n   \"boolean\" -> js(\"Boolean\")\n   else -> js(\"Object\").getPrototypeOf(this).constructor\n   }\n\n/**\n * Obtains a constructor reference for the given `KClass`.\n */\nval <T : Any> KClass<T>.js: JsClass<T>\n   get() = (this as KClassImpl<T>).jClass\n\n/**\n * Obtains a `KClass` instance for the given constructor reference.\n */\nval <T : Any> JsClass<T>.kotlin: KClass<T>\n   get() = getKClass(this)\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect.js.internal\n\nimport kotlin.reflect.*\n\ninternal abstract class KClassImpl<T : Any>(\n   internal open val jClass: JsClass<T>\n) : KClass<T> {\n   override val annotations: List<Annotation>\n   get() = TODO()\n   override val constructors: Collection<KFunction<T>>\n   get() = TODO()\n   override val isAbstract: Boolean\n   get() = TODO()\n   override val isCompanion: Boolean\n   get() = TODO()\n   override val isData: Boolean\n   get() = TODO()\n   override val isFinal: Boolean\n   get() = TODO()\n   override val isInner: Boolean\n   get() = TODO()\n   override val isOpen: Boolean\n   get() = TODO()\n   override val isSealed: Boolean\n   get() = TODO()\n   override val members: Collection<KCallable<*>>\n   get() = TODO()\n   override val nestedClasses: Collection<KClass<*>>\n   get() = TODO()\n   override val objectInstance: T?\n   get() = TODO()\n   override val qualifiedName: String?\n   get() = TODO()\n   override val supertypes: List<KType>\n   get() = TODO()\n   override val typeParameters: List<KTypeParameter>\n   get() = TODO()\n   override val visibility: KVisibility?\n   get() = TODO()\n\n   override fun equals(other: Any?): Boolean {\n   return other is KClassImpl<*> && jClass == other.jClass\n   }\n\n   // TODO: use FQN\n   override fun hashCode(): Int = simpleName?.hashCode() ?: 0\n\n   override fun toString(): String {\n   // TODO: use FQN\n   return \"class $simpleName\"\n   }\n}\n\ninternal class SimpleKClassImpl<T : Any>(jClass: JsClass<T>) : KClassImpl<T>(jClass) {\n   override val simpleName: String? = jClass.asDynamic().`$metadata$`?.simpleName.unsafeCast<String?>()\n\n   override fun isInstance(value: Any?): Boolean {\n   return js(\"Kotlin\").isType(value, jClass)\n   }\n}\n\ninternal class PrimitiveKClassImpl<T : Any>(\n   jClass: JsClass<T>,\n   private val givenSimpleName: String,\n   private val isInstanceFunction: (Any?) -> Boolean\n) : KClassImpl<T>(jClass) {\n   override fun equals(other: Any?): Boolean {\n   if (other !is PrimitiveKClassImpl<*>) return false\n   return super.equals(other) && givenSimpleName == other.givenSimpleName\n   }\n\n   override val simpleName: String? get() = givenSimpleName\n\n   override fun isInstance(value: Any?): Boolean {\n   return isInstanceFunction(value)\n   }\n}\n\ninternal object NothingKClassImpl : KClassImpl<Nothing>(js(\"Object\")) {\n   override val simpleName: String = \"Nothing\"\n\n   override fun isInstance(value: Any?): Boolean = false\n\n   override val jClass: JsClass<Nothing>\n   get() = throw UnsupportedOperationException(\"There's no native JS class for Nothing type\")\n\n   override fun equals(other: Any?): Boolean = other === this\n\n   override fun hashCode(): Int = 0\n}","/*\n * Copyright 2010-2017 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.reflect.js.internal\n\nimport kotlin.js.JsClass\n\n@JsName(\"PrimitiveClasses\")\ninternal object

PrimitiveClasses {\n @JsName(\"anyClass\")\n val anyClass =
PrimitiveKClassImpl(js(\"Object\").unsafeCast<JsClass<Any>>(), \"Any\", { it is Any })\n\n
@JsName(\"numberClass\")\n val numberClass =
PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Number>>(), \"Number\", { it is Number })\n\n
@JsName(\"nothingClass\")\n val nothingClass = NothingKClassImpl\n\n @JsName(\"booleanClass\")\n val
booleanClass = PrimitiveKClassImpl(js(\"Boolean\").unsafeCast<JsClass<Boolean>>(), \"Boolean\", { it is
Boolean })\n\n @JsName(\"byteClass\")\n val byteClass =
PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Byte>>(), \"Byte\", { it is Byte })\n\n
@JsName(\"shortClass\")\n val shortClass = PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Short>>(),
\"Short\", { it is Short })\n\n @JsName(\"intClass\")\n val intClass =
PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Int>>(), \"Int\", { it is Int })\n\n
@JsName(\"floatClass\")\n val floatClass = PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Float>>(),
\"Float\", { it is Float })\n\n @JsName(\"doubleClass\")\n val doubleClass =
PrimitiveKClassImpl(js(\"Number\").unsafeCast<JsClass<Double>>(), \"Double\", { it is Double })\n\n
@JsName(\"arrayClass\")\n val arrayClass =
PrimitiveKClassImpl(js(\"Array\").unsafeCast<JsClass<Array<*>>>(), \"Array\", { it is Array<*> })\n\n
@JsName(\"stringClass\")\n val stringClass = PrimitiveKClassImpl(js(\"String\").unsafeCast<JsClass<String>>(),
\"String\", { it is String })\n\n @JsName(\"throwableClass\")\n val throwableClass =
PrimitiveKClassImpl(js(\"Error\").unsafeCast<JsClass<Throwable>>(), \"Throwable\", { it is Throwable })\n\n
@JsName(\"booleanArrayClass\")\n val booleanArrayClass =
PrimitiveKClassImpl(js(\"Array\").unsafeCast<JsClass<BooleanArray>>(), \"BooleanArray\", { it is BooleanArray
})\n\n @JsName(\"charArrayClass\")\n val charArrayClass =
PrimitiveKClassImpl(js(\"Uint16Array\").unsafeCast<JsClass<CharArray>>(), \"CharArray\", { it is CharArray
})\n\n @JsName(\"byteArrayClass\")\n val byteArrayClass =
PrimitiveKClassImpl(js(\"Int8Array\").unsafeCast<JsClass<ByteArray>>(), \"ByteArray\", { it is ByteArray })\n\n
@JsName(\"shortArrayClass\")\n val shortArrayClass =
PrimitiveKClassImpl(js(\"Int16Array\").unsafeCast<JsClass<ShortArray>>(), \"ShortArray\", { it is ShortArray
})\n\n @JsName(\"intArrayClass\")\n val intArrayClass =
PrimitiveKClassImpl(js(\"Int32Array\").unsafeCast<JsClass<IntArray>>(), \"IntArray\", { it is IntArray })\n\n
@JsName(\"longArrayClass\")\n val longArrayClass =
PrimitiveKClassImpl(js(\"Array\").unsafeCast<JsClass<LongArray>>(), \"LongArray\", { it is LongArray })\n\n
@JsName(\"floatArrayClass\")\n val floatArrayClass =
PrimitiveKClassImpl(js(\"Float32Array\").unsafeCast<JsClass<FloatArray>>(), \"FloatArray\", { it is FloatArray
})\n\n @JsName(\"doubleArrayClass\")\n val doubleArrayClass =
PrimitiveKClassImpl(js(\"Float64Array\").unsafeCast<JsClass<DoubleArray>>(), \"DoubleArray\", { it is
DoubleArray })\n\n @JsName(\"functionClass\")\n fun functionClass(arity: Int): KClassImpl<Any> {\n
return functionClasses.get(arity) ?: run {\n   val result =
PrimitiveKClassImpl(js(\"Function\").unsafeCast<JsClass<Any>>(), \"Function$arity\",\n
{ jsTypeOf(it) === \"function\" && it.asDynamic().length == arity })\n   functionClasses.asDynamic()[arity]
= result\n   result\n   }\n }\n}\n\nprivate val functionClasses =
arrayOfNulls<KClassImpl<Any>>(0)","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the
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on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or
implied.\n * See the License for the specific language governing permissions and\n * limitations under the
License.\n */\n\n// a package is omitted to get declarations directly under the module\n\nimport
kotlin.reflect.KClass\nimport kotlin.reflect.js.internal.*\n\n@JsName(\"getKClass\")\ninternal fun <T : Any>

getKClass(jClass: JsClass<T>): KClass<T> =
getOrCreateKClass(jClass)\n@JsName(\"getKClassFromExpression\")\ninternal fun <T : Any>
getKClassFromExpression(e: T): KClass<T> =\n   when (jsTypeOf(e)) {\n   \"string\" ->
PrimitiveClasses.stringClass\n   \"number\" -> if (js(\"e | 0\") === e) PrimitiveClasses.intClass else
PrimitiveClasses.doubleClass\n   \"boolean\" -> PrimitiveClasses.booleanClass\n   \"function\" ->
PrimitiveClasses.functionClass(e.asDynamic().length)\n   else -> {\n   when {\n   e is
BooleanArray -> PrimitiveClasses.booleanArrayClass\n   e is CharArray ->
PrimitiveClasses.charArrayClass\n   e is ByteArray -> PrimitiveClasses.byteArrayClass\n   e is
ShortArray -> PrimitiveClasses.shortArrayClass\n   e is IntArray -> PrimitiveClasses.intArrayClass\n
        e is LongArray -> PrimitiveClasses.longArrayClass\n   e is FloatArray ->
PrimitiveClasses.floatArrayClass\n   e is DoubleArray -> PrimitiveClasses.doubleArrayClass\n
 e is KClass<*> -> KClass::class\n   e is Array<*> -> PrimitiveClasses.arrayClass\n   else ->
{\n   val constructor = js(\"Object\").getPrototypeOf(e).constructor\n   when {\n
    constructor === js(\"Object\") -> PrimitiveClasses.anyClass\n   constructor === js(\"Error\") ->
PrimitiveClasses.throwableClass\n   else -> {\n   val jsClass: JsClass<T> =
constructor\n   getOrCreateKClass(jsClass)\n   }\n   }\n
}\n   }\n   }\n   }.unsafeCast<KClass<T>>()\n\nprivate fun <T : Any> getOrCreateKClass(jClass:
JsClass<T>): KClass<T> {\n   if (jClass === js(\"String\")) return
PrimitiveClasses.stringClass.unsafeCast<KClass<T>>()\n\n   val metadata = jClass.asDynamic().`$metadata$`\n\n
return if (metadata != null) {\n   if (metadata.`$kClass$` == null) {\n   val kClass =
SimpleKClassImpl(jClass)\n   metadata.`$kClass$` = kClass\n   kClass\n   } else {\n
metadata.`$kClass$`\n   }\n   } else {\n   SimpleKClassImpl(jClass)\n   }\n}\n\n","/*\n * Copyright 2010-
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OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language
governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.js\n\n/**\n * Exposes the
JavaScript [RegExp
object](https://developer.mozilla.org/en/docs/Web/JavaScript/Reference/Global_Objects/RegExp) to Kotlin.\n
*/\npublic external class RegExp(pattern: String, flags: String? = definedExternally) {\n\n   public fun test(str:
String): Boolean\n\n   public fun exec(str: String): RegExpMatch?\n\n   public override fun toString(): String\n\n
/**\n   * The lastIndex is a read/write integer property of regular expressions that specifies the index at which to
start the next match.\n   */\n   public var lastIndex: Int\n\n   public val global: Boolean\n   public val ignoreCase:
Boolean\n   public val multiline: Boolean\n}\n\n/**\n * Resets the regular expression so that subsequent
[RegExp.test] and [RegExp.exec] calls will match starting with the beginning of the input string.\n */\npublic fun
RegExp.reset() {\n   lastIndex = 0\n}\n\n// TODO: Inherit from array or introduce asArray() extension\n/**\n *
Represents the return value of [RegExp.exec].\n */\npublic external interface RegExpMatch {\n   public val index:
Int\n   public val input: String\n   public val length: Int\n}\n\n/**\n * Returns the entire text matched by
[RegExp.exec] if the [index] parameter is 0, or the text matched by the capturing parenthesis\n * at the given
index.\n */\npublic inline operator fun RegExpMatch.get(index: Int): String? = asDynamic()[index]\n\n/**\n *
Converts the result of [RegExp.exec] to an array where the first element contains the entire matched text and each
subsequent\n * element is the text matched by each capturing parenthesis.\n */\npublic inline fun
RegExpMatch.asArray(): Array<out String?> = unsafeCast<Array<out String?>>()\n","/*\n * Copyright 2010-2015
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OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.sequences\n\ninternal class ConstrainedOnceSequence<T>(sequence: Sequence<T>) : Sequence<T> {\n   private var sequenceRef: Sequence<T>? = sequence\n\n   override fun iterator(): Iterator<T> {\n   val sequence = sequenceRef ?: throw IllegalStateException(\"This sequence can be consumed only once.\")\n   sequenceRef = null\n   return sequence.iterator()\n   }\n}\n","/*\n * Copyright 2010-2016 JetBrains s.r.o.\n *\n * Licensed under the Apache License, Version 2.0 (the \"License\");\n * you may not use this file except in compliance with the License.\n * You may obtain a copy of the License at\n *\n * http://www.apache.org/licenses/LICENSE-2.0\n *\n * Unless required by applicable law or agreed to in writing, software\n * distributed under the License is distributed on an \"AS IS\" BASIS,\n * WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.\n * See the License for the specific language governing permissions and\n * limitations under the License.\n */\n\npackage kotlin.text\n\n\npublic interface Appendable {\n   fun append(csq: CharSequence?): Appendable\n   fun append(csq: CharSequence?, start: Int, end: Int): Appendable\n   fun append(c: Char): Appendable\n}\n\npublic class StringBuilder(content: String = \"\") : Appendable, CharSequence {\n   constructor(@Suppress(\"UNUSED_PARAMETER\") capacity: Int) : this() {}\n\n   constructor(content: CharSequence) : this(content.toString()) {}\n\n   private var string: String = content\n\n   override val length: Int\n   get() = string.asDynamic().length\n\n   override fun get(index: Int): Char = string[index]\n\n   override fun subSequence(start: Int, end: Int): CharSequence = string.substring(start, end)\n\n   override fun append(c: Char): StringBuilder {\n   string += c\n   return this\n   }\n\n   override fun append(csq: CharSequence?): StringBuilder {\n   string += csq.toString()\n   return this\n   }\n\n   override fun append(csq: CharSequence?, start: Int, end: Int): StringBuilder {\n   string += csq.toString().substring(start, end)\n   return this\n   }\n\n   fun append(obj: Any?): StringBuilder {\n   string += obj.toString()\n   return this\n   }\n\n   fun reverse(): StringBuilder {\n   string = string.asDynamic().split(\"\").reverse().join(\"\")\n   return this\n   }\n\n   override fun toString(): String = string\n}\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.khronos.webgl\n\nimport kotlin.js.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\npublic external interface WebGLContextAttributes {\n   var alpha: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n   var depth: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n   var stencil: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var antialias: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n   var premultipliedAlpha: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n   var preserveDrawingBuffer: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var preferLowPowerToHighPerformance: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var failIfMajorPerformanceCaveat: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun WebGLContextAttributes(alpha: Boolean? = true, depth: Boolean? = true, stencil: Boolean? = false, antialias: Boolean? = true, premultipliedAlpha: Boolean? = true, preserveDrawingBuffer: Boolean? = false, preferLowPowerToHighPerformance: Boolean? = false, failIfMajorPerformanceCaveat: Boolean? = false): WebGLContextAttributes {\n   val o = js(\"({})\")\n\n   o[\"alpha\"] = alpha\n   o[\"depth\"] = depth\n   o[\"stencil\"] = stencil\n   o[\"antialias\"] = antialias\n   o[\"premultipliedAlpha\"] = premultipliedAlpha\n   o[\"preserveDrawingBuffer\"] = preserveDrawingBuffer\n   o[\"preferLowPowerToHighPerformance\"] = preferLowPowerToHighPerformance\n   o[\"failIfMajorPerformanceCaveat\"] = failIfMajorPerformanceCaveat\n\n   return o\n}\n\npublic external abstract class WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLBuffer](https://developer.mozilla.org/en/docs/Web/API/WebGLBuffer) to Kotlin\n */\npublic external

abstract class WebGLBuffer : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLFramebuffer](https://developer.mozilla.org/en/docs/Web/API/WebGLFramebuffer) to Kotlin\n */\npublic external abstract class WebGLFramebuffer : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLProgram](https://developer.mozilla.org/en/docs/Web/API/WebGLProgram) to Kotlin\n */\npublic external abstract class WebGLProgram : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLRenderbuffer](https://developer.mozilla.org/en/docs/Web/API/WebGLRenderbuffer) to Kotlin\n */\npublic external abstract class WebGLRenderbuffer : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLShader](https://developer.mozilla.org/en/docs/Web/API/WebGLShader) to Kotlin\n */\npublic external abstract class WebGLShader : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLTexture](https://developer.mozilla.org/en/docs/Web/API/WebGLTexture) to Kotlin\n */\npublic external abstract class WebGLTexture : WebGLObject {\n}\n\n/**\n * Exposes the JavaScript [WebGLUniformLocation](https://developer.mozilla.org/en/docs/Web/API/WebGLUniformLocation) to Kotlin\n */\npublic external abstract class WebGLUniformLocation {\n}\n\n/**\n * Exposes the JavaScript [WebGLActiveInfo](https://developer.mozilla.org/en/docs/Web/API/WebGLActiveInfo) to Kotlin\n */\npublic external abstract class WebGLActiveInfo {\n   open val size: Int\n   open val type: Int\n   open val name: String\n}\n\n/**\n * Exposes the JavaScript [WebGLShaderPrecisionFormat](https://developer.mozilla.org/en/docs/Web/API/WebGLShaderPrecisionFormat) to Kotlin\n */\npublic external abstract class WebGLShaderPrecisionFormat {\n   open val rangeMin: Int\n   open val rangeMax: Int\n   open val precision: Int\n}\n\npublic external interface WebGLRenderingContextBase {\n   val canvas: HTMLCanvasElement\n   val drawingBufferWidth: Int\n   val drawingBufferHeight: Int\n   fun getContextAttributes(): WebGLContextAttributes?\n   fun isContextLost(): Boolean\n   fun getSupportedExtensions(): Array<String>?\n   fun getExtension(name: String): dynamic\n   fun activeTexture(texture: Int): Unit\n   fun attachShader(program: WebGLProgram?, shader: WebGLShader?): Unit\n   fun bindAttribLocation(program: WebGLProgram?, index: Int, name: String): Unit\n   fun bindBuffer(target: Int, buffer: WebGLBuffer?): Unit\n   fun bindFramebuffer(target: Int, framebuffer: WebGLFramebuffer?): Unit\n   fun bindRenderbuffer(target: Int, renderbuffer: WebGLRenderbuffer?): Unit\n   fun bindTexture(target: Int, texture: WebGLTexture?): Unit\n   fun blendColor(red: Float, green: Float, blue: Float, alpha: Float): Unit\n   fun blendEquation(mode: Int): Unit\n   fun blendEquationSeparate(modeRGB: Int, modeAlpha: Int): Unit\n   fun blendFunc(sfactor: Int, dfactor: Int): Unit\n   fun blendFuncSeparate(srcRGB: Int, dstRGB: Int, srcAlpha: Int, dstAlpha: Int): Unit\n   fun bufferData(target: Int, size: Int, usage: Int): Unit\n   fun bufferData(target: Int, data: BufferDataSource?, usage: Int): Unit\n   fun bufferSubData(target: Int, offset: Int, data: BufferDataSource?): Unit\n   fun checkFramebufferStatus(target: Int): Int\n   fun clear(mask: Int): Unit\n   fun clearColor(red: Float, green: Float, blue: Float, alpha: Float): Unit\n   fun clearDepth(depth: Float): Unit\n   fun clearStencil(s: Int): Unit\n   fun colorMask(red: Boolean, green: Boolean, blue: Boolean, alpha: Boolean): Unit\n   fun compileShader(shader: WebGLShader?): Unit\n   fun compressedTexImage2D(target: Int, level: Int, internalformat: Int, width: Int, height: Int, border: Int, data: ArrayBufferView): Unit\n   fun compressedTexSubImage2D(target: Int, level: Int, xoffset: Int, yoffset: Int, width: Int, height: Int, format: Int, data: ArrayBufferView): Unit\n   fun copyTexImage2D(target: Int, level: Int, internalformat: Int, x: Int, y: Int, width: Int, height: Int, border: Int): Unit\n   fun copyTexSubImage2D(target: Int, level: Int, xoffset: Int, yoffset: Int, x: Int, y: Int, width: Int, height: Int): Unit\n   fun createBuffer(): WebGLBuffer?\n   fun createFramebuffer(): WebGLFramebuffer?\n   fun createProgram(): WebGLProgram?\n   fun createRenderbuffer(): WebGLRenderbuffer?\n   fun createShader(type: Int): WebGLShader?\n   fun createTexture(): WebGLTexture?\n   fun cullFace(mode: Int): Unit\n   fun deleteBuffer(buffer: WebGLBuffer?): Unit\n   fun deleteFramebuffer(framebuffer: WebGLFramebuffer?): Unit\n   fun deleteProgram(program: WebGLProgram?): Unit\n   fun deleteRenderbuffer(renderbuffer: WebGLRenderbuffer?): Unit\n   fun deleteShader(shader: WebGLShader?): Unit\n   fun deleteTexture(texture: WebGLTexture?): Unit\n   fun depthFunc(func: Int): Unit\n   fun depthMask(flag: Boolean): Unit\n   fun depthRange(zNear: Float, zFar: Float): Unit\n   fun detachShader(program: WebGLProgram?, shader: WebGLShader?): Unit\n   fun disable(cap: Int): Unit\n   fun disableVertexAttribArray(index: Int): Unit\n   fun

drawArrays(mode: Int, first: Int, count: Int): Unit\n   fun drawElements(mode: Int, count: Int, type: Int, offset: Int): Unit\n   fun enable(cap: Int): Unit\n   fun enableVertexAttribArray(index: Int): Unit\n   fun finish(): Unit\n   fun flush(): Unit\n   fun framebufferRenderbuffer(target: Int, attachment: Int, renderbuffertarget: Int, renderbuffer: WebGLRenderbuffer?): Unit\n   fun framebufferTexture2D(target: Int, attachment: Int, textarget: Int, texture: WebGLTexture?, level: Int): Unit\n   fun frontFace(mode: Int): Unit\n   fun generateMipmap(target: Int): Unit\n   fun getActiveAttrib(program: WebGLProgram?, index: Int): WebGLActiveInfo?\n   fun getActiveUniform(program: WebGLProgram?, index: Int): WebGLActiveInfo?\n   fun getAttachedShaders(program: WebGLProgram?): Array<WebGLShader>?\n   fun getAttribLocation(program: WebGLProgram?, name: String): Int\n   fun getBufferParameter(target: Int, pname: Int): Any?\n   fun getParameter(pname: Int): Any?\n   fun getError(): Int\n   fun getFramebufferAttachmentParameter(target: Int, attachment: Int, pname: Int): Any?\n   fun getProgramParameter(program: WebGLProgram?, pname: Int): Any?\n fun getProgramInfoLog(program: WebGLProgram?): String?\n   fun getRenderbufferParameter(target: Int, pname: Int): Any?\n   fun getShaderParameter(shader: WebGLShader?, pname: Int): Any?\n   fun getShaderPrecisionFormat(shadertype: Int, precisiontype: Int): WebGLShaderPrecisionFormat?\n   fun getShaderInfoLog(shader: WebGLShader?): String?\n   fun getShaderSource(shader: WebGLShader?): String?\n fun getTexParameter(target: Int, pname: Int): Any?\n   fun getUniform(program: WebGLProgram?, location: WebGLUniformLocation?): Any?\n   fun getUniformLocation(program: WebGLProgram?, name: String): WebGLUniformLocation?\n   fun getVertexAttrib(index: Int, pname: Int): Any?\n   fun getVertexAttribOffset(index: Int, pname: Int): Int\n   fun hint(target: Int, mode: Int): Unit\n   fun isBuffer(buffer: WebGLBuffer?): Boolean\n   fun isEnabled(cap: Int): Boolean\n   fun isFramebuffer(framebuffer: WebGLFramebuffer?): Boolean\n   fun isProgram(program: WebGLProgram?): Boolean\n   fun isRenderbuffer(renderbuffer: WebGLRenderbuffer?): Boolean\n   fun isShader(shader: WebGLShader?): Boolean\n fun isTexture(texture: WebGLTexture?): Boolean\n   fun lineWidth(width: Float): Unit\n   fun linkProgram(program: WebGLProgram?): Unit\n   fun pixelStorei(pname: Int, param: Int): Unit\n   fun polygonOffset(factor: Float, units: Float): Unit\n   fun readPixels(x: Int, y: Int, width: Int, height: Int, format: Int, type: Int, pixels: ArrayBufferView?): Unit\n   fun renderbufferStorage(target: Int, internalformat: Int, width: Int, height: Int): Unit\n   fun sampleCoverage(value: Float, invert: Boolean): Unit\n   fun scissor(x: Int, y: Int, width: Int, height: Int): Unit\n   fun shaderSource(shader: WebGLShader?, source: String): Unit\n   fun stencilFunc(func: Int, ref: Int, mask: Int): Unit\n   fun stencilFuncSeparate(face: Int, func: Int, ref: Int, mask: Int): Unit\n   fun stencilMask(mask: Int): Unit\n   fun stencilMaskSeparate(face: Int, mask: Int): Unit\n   fun stencilOp(fail: Int, zfail: Int, zpass: Int): Unit\n   fun stencilOpSeparate(face: Int, fail: Int, zfail: Int, zpass: Int): Unit\n   fun texImage2D(target: Int, level: Int, internalformat: Int, width: Int, height: Int, border: Int, format: Int, type: Int, pixels: ArrayBufferView?): Unit\n   fun texImage2D(target: Int, level: Int, internalformat: Int, format: Int, type: Int, source: TexImageSource?): Unit\n   fun texParameterf(target: Int, pname: Int, param: Float): Unit\n   fun texParameteri(target: Int, pname: Int, param: Int): Unit\n   fun texSubImage2D(target: Int, level: Int, xoffset: Int, yoffset: Int, width: Int, height: Int, format: Int, type: Int, pixels: ArrayBufferView?): Unit\n   fun texSubImage2D(target: Int, level: Int, xoffset: Int, yoffset: Int, format: Int, type: Int, source: TexImageSource?): Unit\n   fun uniform1f(location: WebGLUniformLocation?, x: Float): Unit\n   fun uniform1fv(location: WebGLUniformLocation?, v: Float32Array): Unit\n   fun uniform1fv(location: WebGLUniformLocation?, v: Array<Float>): Unit\n   fun uniform1i(location: WebGLUniformLocation?, x: Int): Unit\n   fun uniform1iv(location: WebGLUniformLocation?, v: Int32Array): Unit\n   fun uniform1iv(location: WebGLUniformLocation?, v: Array<Int>): Unit\n   fun uniform2f(location: WebGLUniformLocation?, x: Float, y: Float): Unit\n   fun uniform2fv(location: WebGLUniformLocation?, v: Float32Array): Unit\n   fun uniform2fv(location: WebGLUniformLocation?, v: Array<Float>): Unit\n   fun uniform2i(location: WebGLUniformLocation?, x: Int, y: Int): Unit\n   fun uniform2iv(location: WebGLUniformLocation?, v: Int32Array): Unit\n   fun uniform2iv(location: WebGLUniformLocation?, v: Array<Int>): Unit\n   fun uniform3f(location: WebGLUniformLocation?, x: Float, y: Float, z: Float): Unit\n   fun uniform3fv(location: WebGLUniformLocation?, v: Float32Array): Unit\n   fun uniform3fv(location: WebGLUniformLocation?, v:

Array<Float>): Unit\n   fun uniform3i(location: WebGLUniformLocation?, x: Int, y: Int, z: Int): Unit\n   fun uniform3iv(location: WebGLUniformLocation?, v: Int32Array): Unit\n   fun uniform3iv(location: WebGLUniformLocation?, v: Array<Int>): Unit\n   fun uniform4f(location: WebGLUniformLocation?, x: Float, y: Float, z: Float, w: Float): Unit\n   fun uniform4fv(location: WebGLUniformLocation?, v: Float32Array): Unit\n   fun uniform4fv(location: WebGLUniformLocation?, v: Array<Float>): Unit\n   fun uniform4i(location: WebGLUniformLocation?, x: Int, y: Int, z: Int, w: Int): Unit\n   fun uniform4iv(location: WebGLUniformLocation?, v: Int32Array): Unit\n   fun uniform4iv(location: WebGLUniformLocation?, v: Array<Int>): Unit\n   fun uniformMatrix2fv(location: WebGLUniformLocation?, transpose: Boolean, value: Float32Array): Unit\n   fun uniformMatrix2fv(location: WebGLUniformLocation?, transpose: Boolean, value: Array<Float>): Unit\n   fun uniformMatrix3fv(location: WebGLUniformLocation?, transpose: Boolean, value: Float32Array): Unit\n   fun uniformMatrix3fv(location: WebGLUniformLocation?, transpose: Boolean, value: Array<Float>): Unit\n   fun uniformMatrix4fv(location: WebGLUniformLocation?, transpose: Boolean, value: Float32Array): Unit\n   fun uniformMatrix4fv(location: WebGLUniformLocation?, transpose: Boolean, value: Array<Float>): Unit\n   fun useProgram(program: WebGLProgram?): Unit\n   fun validateProgram(program: WebGLProgram?): Unit\n   fun vertexAttrib1f(index: Int, x: Float): Unit\n   fun vertexAttrib1fv(index: Int, values: dynamic): Unit\n   fun vertexAttrib2f(index: Int, x: Float, y: Float): Unit\n   fun vertexAttrib2fv(index: Int, values: dynamic): Unit\n   fun vertexAttrib3f(index: Int, x: Float, y: Float, z: Float): Unit\n   fun vertexAttrib3fv(index: Int, values: dynamic): Unit\n   fun vertexAttrib4f(index: Int, x: Float, y: Float, z: Float, w: Float): Unit\n   fun vertexAttrib4fv(index: Int, values: dynamic): Unit\n   fun vertexAttribPointer(index: Int, size: Int, type: Int, normalized: Boolean, stride: Int, offset: Int): Unit\n   fun viewport(x: Int, y: Int, width: Int, height: Int): Unit\n\n   companion object {\n   val DEPTH_BUFFER_BIT: Int\n   val STENCIL_BUFFER_BIT: Int\n   val COLOR_BUFFER_BIT: Int\n   val POINTS: Int\n   val LINES: Int\n   val LINE_LOOP: Int\n   val LINE_STRIP: Int\n   val TRIANGLES: Int\n   val TRIANGLE_STRIP: Int\n   val TRIANGLE_FAN: Int\n   val ZERO: Int\n   val ONE: Int\n   val SRC_COLOR: Int\n   val ONE_MINUS_SRC_COLOR: Int\n   val SRC_ALPHA: Int\n   val ONE_MINUS_SRC_ALPHA: Int\n   val DST_ALPHA: Int\n   val ONE_MINUS_DST_ALPHA: Int\n   val DST_COLOR: Int\n   val ONE_MINUS_DST_COLOR: Int\n   val SRC_ALPHA_SATURATE: Int\n   val FUNC_ADD: Int\n   val BLEND_EQUATION: Int\n   val BLEND_EQUATION_RGB: Int\n   val BLEND_EQUATION_ALPHA: Int\n   val FUNC_SUBTRACT: Int\n   val FUNC_REVERSE_SUBTRACT: Int\n   val BLEND_DST_RGB: Int\n   val BLEND_SRC_RGB: Int\n   val BLEND_DST_ALPHA: Int\n   val BLEND_SRC_ALPHA: Int\n   val CONSTANT_COLOR: Int\n   val ONE_MINUS_CONSTANT_COLOR: Int\n   val CONSTANT_ALPHA: Int\n   val ONE_MINUS_CONSTANT_ALPHA: Int\n   val BLEND_COLOR: Int\n   val ARRAY_BUFFER: Int\n   val ELEMENT_ARRAY_BUFFER: Int\n   val ARRAY_BUFFER_BINDING: Int\n   val ELEMENT_ARRAY_BUFFER_BINDING: Int\n   val STREAM_DRAW: Int\n   val STATIC_DRAW: Int\n   val DYNAMIC_DRAW: Int\n   val BUFFER_SIZE: Int\n   val BUFFER_USAGE: Int\n   val CURRENT_VERTEX_ATTRIB: Int\n   val FRONT: Int\n   val BACK: Int\n   val FRONT_AND_BACK: Int\n   val CULL_FACE: Int\n   val BLEND: Int\n   val DITHER: Int\n   val STENCIL_TEST: Int\n   val DEPTH_TEST: Int\n   val SCISSOR_TEST: Int\n   val POLYGON_OFFSET_FILL: Int\n   val SAMPLE_ALPHA_TO_COVERAGE: Int\n   val SAMPLE_COVERAGE: Int\n   val NO_ERROR: Int\n   val INVALID_ENUM: Int\n   val INVALID_VALUE: Int\n   val INVALID_OPERATION: Int\n   val OUT_OF_MEMORY: Int\n   val CW: Int\n   val CCW: Int\n   val LINE_WIDTH: Int\n   val ALIASED_POINT_SIZE_RANGE: Int\n   val ALIASED_LINE_WIDTH_RANGE: Int\n   val CULL_FACE_MODE: Int\n   val FRONT_FACE: Int\n   val DEPTH_RANGE: Int\n   val DEPTH_WRITEMASK: Int\n   val DEPTH_CLEAR_VALUE: Int\n   val DEPTH_FUNC: Int\n   val STENCIL_CLEAR_VALUE: Int\n   val STENCIL_FUNC: Int\n   val STENCIL_FAIL: Int\n   val STENCIL_PASS_DEPTH_FAIL: Int\n   val STENCIL_PASS_DEPTH_PASS: Int\n   val STENCIL_REF: Int\n   val STENCIL_VALUE_MASK: Int\n   val STENCIL_WRITEMASK: Int\n   val STENCIL_BACK_FUNC: Int\n   val STENCIL_BACK_FAIL: Int\n   val

STENCIL_BACK_PASS_DEPTH_FAIL: Int\n   val STENCIL_BACK_PASS_DEPTH_PASS: Int\n   val STENCIL_BACK_REF: Int\n   val STENCIL_BACK_VALUE_MASK: Int\n   val STENCIL_BACK_WRITEMASK: Int\n   val VIEWPORT: Int\n   val SCISSOR_BOX: Int\n   val COLOR_CLEAR_VALUE: Int\n   val COLOR_WRITEMASK: Int\n   val UNPACK_ALIGNMENT: Int\n   val PACK_ALIGNMENT: Int\n   val MAX_TEXTURE_SIZE: Int\n   val MAX_VIEWPORT_DIMS: Int\n   val SUBPIXEL_BITS: Int\n   val RED_BITS: Int\n   val GREEN_BITS: Int\n   val BLUE_BITS: Int\n   val ALPHA_BITS: Int\n   val DEPTH_BITS: Int\n   val STENCIL_BITS: Int\n   val POLYGON_OFFSET_UNITS: Int\n   val POLYGON_OFFSET_FACTOR: Int\n   val TEXTURE_BINDING_2D: Int\n   val SAMPLE_BUFFERS: Int\n   val SAMPLES: Int\n   val SAMPLE_COVERAGE_VALUE: Int\n   val SAMPLE_COVERAGE_INVERT: Int\n   val COMPRESSED_TEXTURE_FORMATS: Int\n   val DONT_CARE: Int\n   val FASTEST: Int\n   val NICEST: Int\n   val GENERATE_MIPMAP_HINT: Int\n   val BYTE: Int\n   val UNSIGNED_BYTE: Int\n   val SHORT: Int\n   val UNSIGNED_SHORT: Int\n   val INT: Int\n   val UNSIGNED_INT: Int\n   val FLOAT: Int\n   val DEPTH_COMPONENT: Int\n   val ALPHA: Int\n   val RGB: Int\n   val RGBA: Int\n   val LUMINANCE: Int\n   val LUMINANCE_ALPHA: Int\n   val UNSIGNED_SHORT_4_4_4_4: Int\n   val UNSIGNED_SHORT_5_5_5_1: Int\n   val UNSIGNED_SHORT_5_6_5: Int\n   val FRAGMENT_SHADER: Int\n   val VERTEX_SHADER: Int\n val MAX_VERTEX_ATTRIBS: Int\n   val MAX_VERTEX_UNIFORM_VECTORS: Int\n   val MAX_VARYING_VECTORS: Int\n   val MAX_COMBINED_TEXTURE_IMAGE_UNITS: Int\n   val MAX_VERTEX_TEXTURE_IMAGE_UNITS: Int\n   val MAX_TEXTURE_IMAGE_UNITS: Int\n   val MAX_FRAGMENT_UNIFORM_VECTORS: Int\n   val SHADER_TYPE: Int\n   val DELETE_STATUS: Int\n   val LINK_STATUS: Int\n   val VALIDATE_STATUS: Int\n   val ATTACHED_SHADERS: Int\n   val ACTIVE_UNIFORMS: Int\n   val ACTIVE_ATTRIBUTES: Int\n   val SHADING_LANGUAGE_VERSION: Int\n   val CURRENT_PROGRAM: Int\n   val NEVER: Int\n   val LESS: Int\n   val EQUAL: Int\n   val LEQUAL: Int\n   val GREATER: Int\n   val NOTEQUAL: Int\n   val GEQUAL: Int\n   val ALWAYS: Int\n   val KEEP: Int\n   val REPLACE: Int\n   val INCR: Int\n   val DECR: Int\n   val INVERT: Int\n   val INCR_WRAP: Int\n   val DECR_WRAP: Int\n   val VENDOR: Int\n   val RENDERER: Int\n   val VERSION: Int\n   val NEAREST: Int\n   val LINEAR: Int\n   val NEAREST_MIPMAP_NEAREST: Int\n   val LINEAR_MIPMAP_NEAREST: Int\n   val NEAREST_MIPMAP_LINEAR: Int\n   val LINEAR_MIPMAP_LINEAR: Int\n   val TEXTURE_MAG_FILTER: Int\n   val TEXTURE_MIN_FILTER: Int\n   val TEXTURE_WRAP_S: Int\n   val TEXTURE_WRAP_T: Int\n   val TEXTURE_2D: Int\n   val TEXTURE: Int\n   val TEXTURE_CUBE_MAP: Int\n   val TEXTURE_BINDING_CUBE_MAP: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_X: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_X: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_Y: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_Y: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_Z: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_Z: Int\n   val MAX_CUBE_MAP_TEXTURE_SIZE: Int\n   val TEXTURE0: Int\n   val TEXTURE1: Int\n   val TEXTURE2: Int\n   val TEXTURE3: Int\n   val TEXTURE4: Int\n   val TEXTURE5: Int\n   val TEXTURE6: Int\n   val TEXTURE7: Int\n   val TEXTURE8: Int\n   val TEXTURE9: Int\n   val TEXTURE10: Int\n   val TEXTURE11: Int\n   val TEXTURE12: Int\n   val TEXTURE13: Int\n   val TEXTURE14: Int\n   val TEXTURE15: Int\n   val TEXTURE16: Int\n   val TEXTURE17: Int\n   val TEXTURE18: Int\n   val TEXTURE19: Int\n   val TEXTURE20: Int\n   val TEXTURE21: Int\n   val TEXTURE22: Int\n   val TEXTURE23: Int\n   val TEXTURE24: Int\n   val TEXTURE25: Int\n   val TEXTURE26: Int\n   val TEXTURE27: Int\n   val TEXTURE28: Int\n   val TEXTURE29: Int\n   val TEXTURE30: Int\n   val TEXTURE31: Int\n   val ACTIVE_TEXTURE: Int\n   val REPEAT: Int\n   val CLAMP_TO_EDGE: Int\n   val MIRRORED_REPEAT: Int\n   val FLOAT_VEC2: Int\n   val FLOAT_VEC3: Int\n   val FLOAT_VEC4: Int\n   val INT_VEC2: Int\n   val INT_VEC3: Int\n   val INT_VEC4: Int\n   val BOOL: Int\n   val BOOL_VEC2: Int\n   val BOOL_VEC3: Int\n   val

BOOL_VEC4: Int\n   val FLOAT_MAT2: Int\n   val FLOAT_MAT3: Int\n   val FLOAT_MAT4: Int\n
val SAMPLER_2D: Int\n   val SAMPLER_CUBE: Int\n   val VERTEX_ATTRIB_ARRAY_ENABLED:
Int\n   val VERTEX_ATTRIB_ARRAY_SIZE: Int\n   val VERTEX_ATTRIB_ARRAY_STRIDE: Int\n
val VERTEX_ATTRIB_ARRAY_TYPE: Int\n   val VERTEX_ATTRIB_ARRAY_NORMALIZED: Int\n
val VERTEX_ATTRIB_ARRAY_POINTER: Int\n   val VERTEX_ATTRIB_ARRAY_BUFFER_BINDING:
Int\n   val IMPLEMENTATION_COLOR_READ_TYPE: Int\n   val
IMPLEMENTATION_COLOR_READ_FORMAT: Int\n   val COMPILE_STATUS: Int\n   val
LOW_FLOAT: Int\n   val MEDIUM_FLOAT: Int\n   val HIGH_FLOAT: Int\n   val LOW_INT: Int\n
val MEDIUM_INT: Int\n   val HIGH_INT: Int\n   val FRAMEBUFFER: Int\n   val RENDERBUFFER:
Int\n   val RGBA4: Int\n   val RGB5_A1: Int\n   val RGB565: Int\n   val DEPTH_COMPONENT16:
Int\n   val STENCIL_INDEX: Int\n   val STENCIL_INDEX8: Int\n   val DEPTH_STENCIL: Int\n   val
RENDERBUFFER_WIDTH: Int\n   val RENDERBUFFER_HEIGHT: Int\n   val
RENDERBUFFER_INTERNAL_FORMAT: Int\n   val RENDERBUFFER_RED_SIZE: Int\n   val
RENDERBUFFER_GREEN_SIZE: Int\n   val RENDERBUFFER_BLUE_SIZE: Int\n   val
RENDERBUFFER_ALPHA_SIZE: Int\n   val RENDERBUFFER_DEPTH_SIZE: Int\n   val
RENDERBUFFER_STENCIL_SIZE: Int\n   val FRAMEBUFFER_ATTACHMENT_OBJECT_TYPE: Int\n
val FRAMEBUFFER_ATTACHMENT_OBJECT_NAME: Int\n   val
FRAMEBUFFER_ATTACHMENT_TEXTURE_LEVEL: Int\n   val
FRAMEBUFFER_ATTACHMENT_TEXTURE_CUBE_MAP_FACE: Int\n   val COLOR_ATTACHMENT0:
Int\n   val DEPTH_ATTACHMENT: Int\n   val STENCIL_ATTACHMENT: Int\n   val
DEPTH_STENCIL_ATTACHMENT: Int\n   val NONE: Int\n   val FRAMEBUFFER_COMPLETE: Int\n
val FRAMEBUFFER_INCOMPLETE_ATTACHMENT: Int\n   val
FRAMEBUFFER_INCOMPLETE_MISSING_ATTACHMENT: Int\n   val
FRAMEBUFFER_INCOMPLETE_DIMENSIONS: Int\n   val FRAMEBUFFER_UNSUPPORTED: Int\n
val FRAMEBUFFER_BINDING: Int\n   val RENDERBUFFER_BINDING: Int\n   val
MAX_RENDERBUFFER_SIZE: Int\n   val INVALID_FRAMEBUFFER_OPERATION: Int\n   val
UNPACK_FLIP_Y_WEBGL: Int\n   val UNPACK_PREMULTIPLY_ALPHA_WEBGL: Int\n   val
CONTEXT_LOST_WEBGL: Int\n   val UNPACK_COLORSPACE_CONVERSION_WEBGL: Int\n   val
BROWSER_DEFAULT_WEBGL: Int\n   }\n}\n\n/**\n * Exposes the JavaScript
[WebGLRenderingContext](https://developer.mozilla.org/en/docs/Web/API/WebGLRenderingContext) to Kotlin\n
*/\npublic external abstract class WebGLRenderingContext : WebGLRenderingContextBase, RenderingContext
{\n\n companion object {\n   val DEPTH_BUFFER_BIT: Int\n   val STENCIL_BUFFER_BIT: Int\n   val
COLOR_BUFFER_BIT: Int\n   val POINTS: Int\n   val LINES: Int\n   val LINE_LOOP: Int\n   val
LINE_STRIP: Int\n   val TRIANGLES: Int\n   val TRIANGLE_STRIP: Int\n   val TRIANGLE_FAN:
Int\n   val ZERO: Int\n   val ONE: Int\n   val SRC_COLOR: Int\n   val ONE_MINUS_SRC_COLOR:
Int\n   val SRC_ALPHA: Int\n   val ONE_MINUS_SRC_ALPHA: Int\n   val DST_ALPHA: Int\n   val
ONE_MINUS_DST_ALPHA: Int\n   val DST_COLOR: Int\n   val ONE_MINUS_DST_COLOR: Int\n
val SRC_ALPHA_SATURATE: Int\n   val FUNC_ADD: Int\n   val BLEND_EQUATION: Int\n   val
BLEND_EQUATION_RGB: Int\n   val BLEND_EQUATION_ALPHA: Int\n   val FUNC_SUBTRACT:
Int\n   val FUNC_REVERSE_SUBTRACT: Int\n   val BLEND_DST_RGB: Int\n   val
BLEND_SRC_RGB: Int\n   val BLEND_DST_ALPHA: Int\n   val BLEND_SRC_ALPHA: Int\n   val
CONSTANT_COLOR: Int\n   val ONE_MINUS_CONSTANT_COLOR: Int\n   val CONSTANT_ALPHA:
Int\n   val ONE_MINUS_CONSTANT_ALPHA: Int\n   val BLEND_COLOR: Int\n   val
ARRAY_BUFFER: Int\n   val ELEMENT_ARRAY_BUFFER: Int\n   val ARRAY_BUFFER_BINDING:
Int\n   val ELEMENT_ARRAY_BUFFER_BINDING: Int\n   val STREAM_DRAW: Int\n   val
STATIC_DRAW: Int\n   val DYNAMIC_DRAW: Int\n   val BUFFER_SIZE: Int\n   val
BUFFER_USAGE: Int\n   val CURRENT_VERTEX_ATTRIB: Int\n   val FRONT: Int\n   val BACK:
Int\n   val FRONT_AND_BACK: Int\n   val CULL_FACE: Int\n   val BLEND: Int\n   val DITHER:

Int\n   val STENCIL_TEST: Int\n   val DEPTH_TEST: Int\n   val SCISSOR_TEST: Int\n   val POLYGON_OFFSET_FILL: Int\n   val SAMPLE_ALPHA_TO_COVERAGE: Int\n   val SAMPLE_COVERAGE: Int\n   val NO_ERROR: Int\n   val INVALID_ENUM: Int\n   val INVALID_VALUE: Int\n   val INVALID_OPERATION: Int\n   val OUT_OF_MEMORY: Int\n   val CW: Int\n   val CCW: Int\n   val LINE_WIDTH: Int\n   val ALIASED_POINT_SIZE_RANGE: Int\n   val ALIASED_LINE_WIDTH_RANGE: Int\n   val CULL_FACE_MODE: Int\n   val FRONT_FACE: Int\n val DEPTH_RANGE: Int\n   val DEPTH_WRITEMASK: Int\n   val DEPTH_CLEAR_VALUE: Int\n   val DEPTH_FUNC: Int\n   val STENCIL_CLEAR_VALUE: Int\n   val STENCIL_FUNC: Int\n   val STENCIL_FAIL: Int\n   val STENCIL_PASS_DEPTH_FAIL: Int\n   val STENCIL_PASS_DEPTH_PASS: Int\n   val STENCIL_REF: Int\n   val STENCIL_VALUE_MASK: Int\n   val STENCIL_WRITEMASK: Int\n   val STENCIL_BACK_FUNC: Int\n   val STENCIL_BACK_FAIL: Int\n   val STENCIL_BACK_PASS_DEPTH_FAIL: Int\n   val STENCIL_BACK_PASS_DEPTH_PASS: Int\n   val STENCIL_BACK_REF: Int\n   val STENCIL_BACK_VALUE_MASK: Int\n   val STENCIL_BACK_WRITEMASK: Int\n   val VIEWPORT: Int\n   val SCISSOR_BOX: Int\n   val COLOR_CLEAR_VALUE: Int\n   val COLOR_WRITEMASK: Int\n   val UNPACK_ALIGNMENT: Int\n   val PACK_ALIGNMENT: Int\n   val MAX_TEXTURE_SIZE: Int\n   val MAX_VIEWPORT_DIMS: Int\n   val SUBPIXEL_BITS: Int\n   val RED_BITS: Int\n   val GREEN_BITS: Int\n   val BLUE_BITS: Int\n   val ALPHA_BITS: Int\n   val DEPTH_BITS: Int\n   val STENCIL_BITS: Int\n   val POLYGON_OFFSET_UNITS: Int\n   val POLYGON_OFFSET_FACTOR: Int\n   val TEXTURE_BINDING_2D: Int\n   val SAMPLE_BUFFERS: Int\n   val SAMPLES: Int\n   val SAMPLE_COVERAGE_VALUE: Int\n   val SAMPLE_COVERAGE_INVERT: Int\n   val COMPRESSED_TEXTURE_FORMATS: Int\n   val DONT_CARE: Int\n   val FASTEST: Int\n   val NICEST: Int\n   val GENERATE_MIPMAP_HINT: Int\n   val BYTE: Int\n   val UNSIGNED_BYTE: Int\n   val SHORT: Int\n   val UNSIGNED_SHORT: Int\n   val INT: Int\n   val UNSIGNED_INT: Int\n   val FLOAT: Int\n   val DEPTH_COMPONENT: Int\n   val ALPHA: Int\n   val RGB: Int\n   val RGBA: Int\n   val LUMINANCE: Int\n   val LUMINANCE_ALPHA: Int\n   val UNSIGNED_SHORT_4_4_4_4: Int\n   val UNSIGNED_SHORT_5_5_5_1: Int\n   val UNSIGNED_SHORT_5_6_5: Int\n   val FRAGMENT_SHADER: Int\n   val VERTEX_SHADER: Int\n val MAX_VERTEX_ATTRIBS: Int\n   val MAX_VERTEX_UNIFORM_VECTORS: Int\n   val MAX_VARYING_VECTORS: Int\n   val MAX_COMBINED_TEXTURE_IMAGE_UNITS: Int\n   val MAX_VERTEX_TEXTURE_IMAGE_UNITS: Int\n   val MAX_TEXTURE_IMAGE_UNITS: Int\n   val MAX_FRAGMENT_UNIFORM_VECTORS: Int\n   val SHADER_TYPE: Int\n   val DELETE_STATUS: Int\n   val LINK_STATUS: Int\n   val VALIDATE_STATUS: Int\n   val ATTACHED_SHADERS: Int\n   val ACTIVE_UNIFORMS: Int\n   val ACTIVE_ATTRIBUTES: Int\n   val SHADING_LANGUAGE_VERSION: Int\n   val CURRENT_PROGRAM: Int\n   val NEVER: Int\n   val LESS: Int\n   val EQUAL: Int\n   val LEQUAL: Int\n   val GREATER: Int\n   val NOTEQUAL: Int\n   val GEQUAL: Int\n   val ALWAYS: Int\n   val KEEP: Int\n   val REPLACE: Int\n   val INCR: Int\n   val DECR: Int\n   val INVERT: Int\n   val INCR_WRAP: Int\n   val DECR_WRAP: Int\n   val VENDOR: Int\n   val RENDERER: Int\n   val VERSION: Int\n   val NEAREST: Int\n   val LINEAR: Int\n   val NEAREST_MIPMAP_NEAREST: Int\n   val LINEAR_MIPMAP_NEAREST: Int\n   val NEAREST_MIPMAP_LINEAR: Int\n   val LINEAR_MIPMAP_LINEAR: Int\n   val TEXTURE_MAG_FILTER: Int\n   val TEXTURE_MIN_FILTER: Int\n   val TEXTURE_WRAP_S: Int\n   val TEXTURE_WRAP_T: Int\n   val TEXTURE_2D: Int\n   val TEXTURE: Int\n   val TEXTURE_CUBE_MAP: Int\n   val TEXTURE_BINDING_CUBE_MAP: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_X: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_X: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_Y: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_Y: Int\n   val TEXTURE_CUBE_MAP_POSITIVE_Z: Int\n   val TEXTURE_CUBE_MAP_NEGATIVE_Z: Int\n   val MAX_CUBE_MAP_TEXTURE_SIZE: Int\n   val TEXTURE0: Int\n   val TEXTURE1: Int\n   val

TEXTURE2: Int\n   val TEXTURE3: Int\n   val TEXTURE4: Int\n   val TEXTURE5: Int\n   val
TEXTURE6: Int\n   val TEXTURE7: Int\n   val TEXTURE8: Int\n   val TEXTURE9: Int\n   val
TEXTURE10: Int\n   val TEXTURE11: Int\n   val TEXTURE12: Int\n   val TEXTURE13: Int\n   val
TEXTURE14: Int\n   val TEXTURE15: Int\n   val TEXTURE16: Int\n   val TEXTURE17: Int\n   val
TEXTURE18: Int\n   val TEXTURE19: Int\n   val TEXTURE20: Int\n   val TEXTURE21: Int\n   val
TEXTURE22: Int\n   val TEXTURE23: Int\n   val TEXTURE24: Int\n   val TEXTURE25: Int\n   val
TEXTURE26: Int\n   val TEXTURE27: Int\n   val TEXTURE28: Int\n   val TEXTURE29: Int\n   val
TEXTURE30: Int\n   val TEXTURE31: Int\n   val ACTIVE_TEXTURE: Int\n   val REPEAT: Int\n
val CLAMP_TO_EDGE: Int\n   val MIRRORED_REPEAT: Int\n   val FLOAT_VEC2: Int\n   val
FLOAT_VEC3: Int\n   val FLOAT_VEC4: Int\n   val INT_VEC2: Int\n   val INT_VEC3: Int\n   val
INT_VEC4: Int\n   val BOOL: Int\n   val BOOL_VEC2: Int\n   val BOOL_VEC3: Int\n   val
BOOL_VEC4: Int\n   val FLOAT_MAT2: Int\n   val FLOAT_MAT3: Int\n   val FLOAT_MAT4: Int\n
val SAMPLER_2D: Int\n   val SAMPLER_CUBE: Int\n   val VERTEX_ATTRIB_ARRAY_ENABLED:
Int\n   val VERTEX_ATTRIB_ARRAY_SIZE: Int\n   val VERTEX_ATTRIB_ARRAY_STRIDE: Int\n
val VERTEX_ATTRIB_ARRAY_TYPE: Int\n   val VERTEX_ATTRIB_ARRAY_NORMALIZED: Int\n
val VERTEX_ATTRIB_ARRAY_POINTER: Int\n   val VERTEX_ATTRIB_ARRAY_BUFFER_BINDING:
Int\n   val IMPLEMENTATION_COLOR_READ_TYPE: Int\n   val
IMPLEMENTATION_COLOR_READ_FORMAT: Int\n   val COMPILE_STATUS: Int\n   val
LOW_FLOAT: Int\n   val MEDIUM_FLOAT: Int\n   val HIGH_FLOAT: Int\n   val LOW_INT: Int\n
val MEDIUM_INT: Int\n   val HIGH_INT: Int\n   val FRAMEBUFFER: Int\n   val RENDERBUFFER:
Int\n   val RGBA4: Int\n   val RGB5_A1: Int\n   val RGB565: Int\n   val DEPTH_COMPONENT16:
Int\n   val STENCIL_INDEX: Int\n   val STENCIL_INDEX8: Int\n   val DEPTH_STENCIL: Int\n   val
RENDERBUFFER_WIDTH: Int\n   val RENDERBUFFER_HEIGHT: Int\n   val
RENDERBUFFER_INTERNAL_FORMAT: Int\n   val RENDERBUFFER_RED_SIZE: Int\n   val
RENDERBUFFER_GREEN_SIZE: Int\n   val RENDERBUFFER_BLUE_SIZE: Int\n   val
RENDERBUFFER_ALPHA_SIZE: Int\n   val RENDERBUFFER_DEPTH_SIZE: Int\n   val
RENDERBUFFER_STENCIL_SIZE: Int\n   val FRAMEBUFFER_ATTACHMENT_OBJECT_TYPE: Int\n
val FRAMEBUFFER_ATTACHMENT_OBJECT_NAME: Int\n   val
FRAMEBUFFER_ATTACHMENT_TEXTURE_LEVEL: Int\n   val
FRAMEBUFFER_ATTACHMENT_TEXTURE_CUBE_MAP_FACE: Int\n   val COLOR_ATTACHMENT0:
Int\n   val DEPTH_ATTACHMENT: Int\n   val STENCIL_ATTACHMENT: Int\n   val
DEPTH_STENCIL_ATTACHMENT: Int\n   val NONE: Int\n   val FRAMEBUFFER_COMPLETE: Int\n
val FRAMEBUFFER_INCOMPLETE_ATTACHMENT: Int\n   val
FRAMEBUFFER_INCOMPLETE_MISSING_ATTACHMENT: Int\n   val
FRAMEBUFFER_INCOMPLETE_DIMENSIONS: Int\n   val FRAMEBUFFER_UNSUPPORTED: Int\n
val FRAMEBUFFER_BINDING: Int\n   val RENDERBUFFER_BINDING: Int\n   val
MAX_RENDERBUFFER_SIZE: Int\n   val INVALID_FRAMEBUFFER_OPERATION: Int\n   val
UNPACK_FLIP_Y_WEBGL: Int\n   val UNPACK_PREMULTIPLY_ALPHA_WEBGL: Int\n   val
CONTEXT_LOST_WEBGL: Int\n   val UNPACK_COLORSPACE_CONVERSION_WEBGL: Int\n   val
BROWSER_DEFAULT_WEBGL: Int\n   }\n}\n\n/**\n * Exposes the JavaScript
[WebGLContextEvent](https://developer.mozilla.org/en/docs/Web/API/WebGLContextEvent) to Kotlin\n
*/\npublic external open class WebGLContextEvent(type: String, eventInit: WebGLContextEventInit =
definedExternally) : Event {\n   open val statusMessage: String\n}\n\npublic external interface
WebGLContextEventInit : EventInit {\n   var statusMessage: String? /* = \"\" */\n   get() = definedExternally\n
    set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun
WebGLContextEventInit(statusMessage: String? = \"\", bubbles: Boolean? = false, cancelable: Boolean? = false,
composed: Boolean? = false): WebGLContextEventInit {\n   val o = js(\"({})\")\n\n   o[\"statusMessage\"] =
statusMessage\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n

return o\n}\n\n/**\n * Exposes the JavaScript [ArrayBuffer](https://developer.mozilla.org/en/docs/Web/API/ArrayBuffer) to Kotlin\n */\npublic external open class ArrayBuffer(length: Int) : BufferDataSource {\n   open val byteLength: Int\n   fun slice(begin: Int, end: Int = definedExternally): ArrayBuffer\n\n   companion object {\n   fun isView(value: Any?): Boolean\n   }\n}\n\n/**\n * Exposes the JavaScript [ArrayBufferView](https://developer.mozilla.org/en/docs/Web/API/ArrayBufferView) to Kotlin\n */\npublic external interface ArrayBufferView : BufferDataSource {\n   val buffer: ArrayBuffer\n   val byteOffset: Int\n   val byteLength: Int\n}\n\n/**\n * Exposes the JavaScript [Int8Array](https://developer.mozilla.org/en/docs/Web/API/Int8Array) to Kotlin\n */\npublic external open class Int8Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Int8Array)\n   constructor(array: Array<Byte>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Int8Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Byte>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Int8Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Int8Array.get(index: Int): Byte = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Int8Array.set(index: Int, value: Byte): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Uint8Array](https://developer.mozilla.org/en/docs/Web/API/Uint8Array) to Kotlin\n */\npublic external open class Uint8Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Uint8Array)\n   constructor(array: Array<Byte>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Uint8Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Byte>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Uint8Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Uint8Array.get(index: Int): Byte = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Uint8Array.set(index: Int, value: Byte): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Uint8ClampedArray](https://developer.mozilla.org/en/docs/Web/API/Uint8ClampedArray) to Kotlin\n */\npublic external open class Uint8ClampedArray : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Uint8ClampedArray)\n   constructor(array: Array<Byte>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Uint8ClampedArray, offset: Int = definedExternally): Unit\n   fun set(array: Array<Byte>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Uint8ClampedArray\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Uint8ClampedArray.get(index: Int): Byte = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Uint8ClampedArray.set(index: Int, value: Byte): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Int16Array](https://developer.mozilla.org/en/docs/Web/API/Int16Array) to Kotlin\n */\npublic external open class Int16Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Int16Array)\n   constructor(array: Array<Short>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Int16Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Short>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Int16Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Int16Array.get(index: Int): Short = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Int16Array.set(index: Int, value: Short): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Uint16Array](https://developer.mozilla.org/en/docs/Web/API/Uint16Array) to Kotlin\n */\npublic external open class Uint16Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Uint16Array)\n   constructor(array: Array<Short>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length:

Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Uint16Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Short>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Uint16Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Uint16Array.get(index: Int): Short = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Uint16Array.set(index: Int, value: Short): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Int32Array](https://developer.mozilla.org/en/docs/Web/API/Int32Array) to Kotlin\n */\npublic external open class Int32Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Int32Array)\n   constructor(array: Array<Int>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Int32Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Int>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Int32Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Int32Array.get(index: Int): Int = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Int32Array.set(index: Int, value: Int): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Uint32Array](https://developer.mozilla.org/en/docs/Web/API/Uint32Array) to Kotlin\n */\npublic external open class Uint32Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Uint32Array)\n   constructor(array: Array<Int>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Uint32Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Int>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Uint32Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Uint32Array.get(index: Int): Int = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Uint32Array.set(index: Int, value: Int): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Float32Array](https://developer.mozilla.org/en/docs/Web/API/Float32Array) to Kotlin\n */\npublic external open class Float32Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Float32Array)\n   constructor(array: Array<Float>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Float32Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Float>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Float32Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Float32Array.get(index: Int): Float = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Float32Array.set(index: Int, value: Float): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [Float64Array](https://developer.mozilla.org/en/docs/Web/API/Float64Array) to Kotlin\n */\npublic external open class Float64Array : ArrayBufferView {\n   constructor(length: Int)\n   constructor(array: Float64Array)\n   constructor(array: Array<Double>)\n   constructor(buffer: ArrayBuffer, byteOffset: Int = definedExternally, length: Int = definedExternally)\n   open val length: Int\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun set(array: Float64Array, offset: Int = definedExternally): Unit\n   fun set(array: Array<Double>, offset: Int = definedExternally): Unit\n   fun subarray(start: Int, end: Int): Float64Array\n\n   companion object {\n   val BYTES_PER_ELEMENT: Int\n   }\n}\n@kotlin.internal.InlineOnly inline operator fun Float64Array.get(index: Int): Double = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Float64Array.set(index: Int, value: Double): Unit { asDynamic()[index] = value; }\n\n/**\n * Exposes the JavaScript [DataView](https://developer.mozilla.org/en/docs/Web/API/DataView) to Kotlin\n */\npublic external open class DataView(buffer: ArrayBuffer, byteOffset: Int = definedExternally, byteLength: Int = definedExternally) : ArrayBufferView {\n   override val buffer: ArrayBuffer\n   override val byteOffset: Int\n   override val byteLength: Int\n   fun getInt8(byteOffset: Int): Byte\n   fun getUint8(byteOffset: Int): Byte\n   fun getInt16(byteOffset: Int, littleEndian: Boolean = definedExternally): Short\n   fun getUint16(byteOffset: Int,

littleEndian: Boolean = definedExternally): Short\n   fun getInt32(byteOffset: Int, littleEndian: Boolean = definedExternally): Int\n   fun getUint32(byteOffset: Int, littleEndian: Boolean = definedExternally): Int\n   fun getFloat32(byteOffset: Int, littleEndian: Boolean = definedExternally): Float\n   fun getFloat64(byteOffset: Int, littleEndian: Boolean = definedExternally): Double\n   fun setInt8(byteOffset: Int, value: Byte): Unit\n   fun setUint8(byteOffset: Int, value: Byte): Unit\n   fun setInt16(byteOffset: Int, value: Short, littleEndian: Boolean = definedExternally): Unit\n   fun setUint16(byteOffset: Int, value: Short, littleEndian: Boolean = definedExternally): Unit\n   fun setInt32(byteOffset: Int, value: Int, littleEndian: Boolean = definedExternally): Unit\n   fun setUint32(byteOffset: Int, value: Int, littleEndian: Boolean = definedExternally): Unit\n   fun setFloat32(byteOffset: Int, value: Float, littleEndian: Boolean = definedExternally): Unit\n   fun setFloat64(byteOffset: Int, value: Double, littleEndian: Boolean = definedExternally): Unit\n}\n\npublic external @marker interface BufferDataSource {\n}\n\npublic external @marker interface TexImageSource {\n}\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.dom.css\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [CSSStyleDeclaration](https://developer.mozilla.org/en/docs/Web/API/CSSStyleDeclaration) to Kotlin\n */\npublic external abstract class CSSStyleDeclaration : ItemArrayLike<String> {\n   open var cssText: String\n   override val length: Int\n   open val parentRule: CSSRule?\n   open var cssFloat: String\n   open var _dashed_attribute: String\n   open var _camel_cased_attribute: String\n   open var _webkit_cased_attribute: String\n   open var alignContent: String\n   open var alignItems: String\n   open var alignSelf: String\n   open var animation: String\n   open var animationDelay: String\n   open var animationDirection: String\n   open var animationDuration: String\n   open var animationFillMode: String\n   open var animationIterationCount: String\n   open var animationName: String\n   open var animationPlayState: String\n   open var animationTimingFunction: String\n   open var backfaceVisibility: String\n   open var background: String\n   open var backgroundAttachment: String\n   open var backgroundClip: String\n   open var backgroundColor: String\n   open var backgroundImage: String\n   open var backgroundOrigin: String\n   open var backgroundPosition: String\n   open var backgroundRepeat: String\n   open var backgroundSize: String\n   open var border: String\n   open var borderBottom: String\n   open var borderBottomColor: String\n   open var borderBottomLeftRadius: String\n   open var borderBottomRightRadius: String\n   open var borderBottomStyle: String\n   open var borderBottomWidth: String\n   open var borderCollapse: String\n   open var borderColor: String\n   open var borderImage: String\n   open var borderImageOutset: String\n   open var borderImageRepeat: String\n   open var borderImageSlice: String\n   open var borderImageSource: String\n   open var borderImageWidth: String\n   open var borderLeft: String\n   open var borderLeftColor: String\n   open var borderLeftStyle: String\n   open var borderLeftWidth: String\n   open var borderRadius: String\n   open var borderRight: String\n   open var borderRightColor: String\n   open var borderRightStyle: String\n   open var borderRightWidth: String\n   open var borderSpacing: String\n   open var borderStyle: String\n   open var borderTop: String\n   open var borderTopColor: String\n   open var borderTopLeftRadius: String\n   open var borderTopRightRadius: String\n   open var borderTopStyle: String\n   open var borderTopWidth: String\n   open var borderWidth: String\n   open var bottom: String\n   open var boxDecorationBreak: String\n   open var boxShadow: String\n   open var boxSizing: String\n   open var breakAfter: String\n   open var breakBefore: String\n   open var breakInside: String\n   open var captionSide: String\n   open var clear: String\n   open var clip: String\n   open var color: String\n   open var columnCount: String\n   open var columnFill: String\n   open var columnGap: String\n   open var columnRule: String\n   open var columnRuleColor: String\n   open var columnRuleStyle: String\n   open var columnRuleWidth: String\n   open var columnSpan: String\n   open var columnWidth: String\n   open var columns: String\n   open var content: String\n   open var counterIncrement: String\n   open var counterReset: String\n   open var cursor: String\n   open var direction: String\n   open var display: String\n   open var emptyCells: String\n   open var filter: String\n   open

var flex: String\n   open var flexBasis: String\n   open var flexDirection: String\n   open var flexFlow: String\n   open var flexGrow: String\n   open var flexShrink: String\n   open var flexWrap: String\n   open var font: String\n   open var fontFamily: String\n   open var fontFeatureSettings: String\n   open var fontKerning: String\n   open var fontLanguageOverride: String\n   open var fontSize: String\n   open var fontSizeAdjust: String\n   open var fontStretch: String\n   open var fontStyle: String\n   open var fontSynthesis: String\n   open var fontVariant: String\n   open var fontVariantAlternates: String\n   open var fontVariantCaps: String\n   open var fontVariantEastAsian: String\n   open var fontVariantLigatures: String\n   open var fontVariantNumeric: String\n   open var fontVariantPosition: String\n   open var fontWeight: String\n   open var hangingPunctuation: String\n   open var height: String\n   open var hyphens: String\n   open var imageOrientation: String\n   open var imageRendering: String\n   open var imageResolution: String\n   open var imeMode: String\n   open var justifyContent: String\n   open var left: String\n   open var letterSpacing: String\n   open var lineBreak: String\n   open var lineHeight: String\n   open var listStyle: String\n   open var listStyleImage: String\n   open var listStylePosition: String\n   open var listStyleType: String\n   open var margin: String\n   open var marginBottom: String\n   open var marginLeft: String\n   open var marginRight: String\n   open var marginTop: String\n   open var mark: String\n   open var markAfter: String\n   open var markBefore: String\n   open var marks: String\n   open var marqueeDirection: String\n   open var marqueePlayCount: String\n   open var marqueeSpeed: String\n   open var marqueeStyle: String\n   open var mask: String\n   open var maskType: String\n   open var maxHeight: String\n   open var maxWidth: String\n   open var minHeight: String\n   open var minWidth: String\n   open var navDown: String\n   open var navIndex: String\n   open var navLeft: String\n   open var navRight: String\n   open var navUp: String\n   open var objectFit: String\n   open var objectPosition: String\n   open var opacity: String\n   open var order: String\n   open var orphans: String\n   open var outline: String\n   open var outlineColor: String\n   open var outlineOffset: String\n   open var outlineStyle: String\n   open var outlineWidth: String\n   open var overflowWrap: String\n   open var overflowX: String\n   open var overflowY: String\n   open var padding: String\n   open var paddingBottom: String\n   open var paddingLeft: String\n   open var paddingRight: String\n   open var paddingTop: String\n   open var pageBreakAfter: String\n   open var pageBreakBefore: String\n   open var pageBreakInside: String\n   open var perspective: String\n   open var perspectiveOrigin: String\n   open var phonemes: String\n   open var position: String\n   open var quotes: String\n   open var resize: String\n   open var rest: String\n   open var restAfter: String\n   open var restBefore: String\n   open var right: String\n   open var tabSize: String\n   open var tableLayout: String\n   open var textAlign: String\n   open var textAlignLast: String\n   open var textCombineUpright: String\n   open var textDecoration: String\n   open var textDecorationColor: String\n   open var textDecorationLine: String\n   open var textDecorationStyle: String\n   open var textIndent: String\n   open var textJustify: String\n   open var textOrientation: String\n   open var textOverflow: String\n   open var textShadow: String\n   open var textTransform: String\n   open var textUnderlinePosition: String\n   open var top: String\n   open var transform: String\n   open var transformOrigin: String\n   open var transformStyle: String\n   open var transition: String\n   open var transitionDelay: String\n   open var transitionDuration: String\n   open var transitionProperty: String\n   open var transitionTimingFunction: String\n   open var unicodeBidi: String\n   open var verticalAlign: String\n   open var visibility: String\n   open var voiceBalance: String\n   open var voiceDuration: String\n   open var voicePitch: String\n   open var voicePitchRange: String\n   open var voiceRate: String\n   open var voiceStress: String\n   open var voiceVolume: String\n   open var whiteSpace: String\n   open var widows: String\n   open var width: String\n   open var wordBreak: String\n   open var wordSpacing: String\n   open var wordWrap: String\n   open var writingMode: String\n   open var zIndex: String\n   override fun item(index: Int): String\n   fun getPropertyValue(property: String): String\n   fun getPropertyPriority(property: String): String\n   fun setProperty(property: String, value: String, priority: String = definedExternally): Unit\n   fun setPropertyValue(property: String, value: String): Unit\n   fun setPropertyPriority(property: String, priority: String): Unit\n   fun removeProperty(property: String): String\n}\n@kotlin.internal.InlineOnly inline operator fun CSSStyleDeclaration.get(index: Int): String? = asDynamic()[index]\n\npublic external abstract class MediaList : ItemArrayLike<String> {\n   open var mediaText: String\n   override val length: Int\n   override fun item(index: Int): String?\n   fun appendMedium(medium:

String): Unit\n   fun deleteMedium(medium: String): Unit\n}\n@kotlin.internal.InlineOnly inline operator fun MediaList.get(index: Int): String? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [StyleSheet](https://developer.mozilla.org/en/docs/Web/API/StyleSheet) to Kotlin\n */\npublic external abstract class StyleSheet {\n   open val type: String\n   open val href: String?\n   open val ownerNode: UnionElementOrProcessingInstruction?\n   open val parentStyleSheet: StyleSheet?\n   open val title: String?\n   open val media: MediaList\n   open var disabled: Boolean\n}\n\n/**\n * Exposes the JavaScript [CSSStyleSheet](https://developer.mozilla.org/en/docs/Web/API/CSSStyleSheet) to Kotlin\n */\npublic external abstract class CSSStyleSheet : StyleSheet {\n   open val ownerRule: CSSRule?\n   open val cssRules: CSSRuleList\n   fun insertRule(rule: String, index: Int): Int\n   fun deleteRule(index: Int): Unit\n}\n\n/**\n * Exposes the JavaScript [StyleSheetList](https://developer.mozilla.org/en/docs/Web/API/StyleSheetList) to Kotlin\n */\npublic external abstract class StyleSheetList : ItemArrayLike<StyleSheet> {\n   override val length: Int\n   override fun item(index: Int): StyleSheet?\n}\n@kotlin.internal.InlineOnly inline operator fun StyleSheetList.get(index: Int): StyleSheet? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [LinkStyle](https://developer.mozilla.org/en/docs/Web/API/LinkStyle) to Kotlin\n */\npublic external interface LinkStyle {\n   val sheet: StyleSheet?\n}\n\n/**\n * Exposes the JavaScript [CSSRuleList](https://developer.mozilla.org/en/docs/Web/API/CSSRuleList) to Kotlin\n */\npublic external abstract class CSSRuleList : ItemArrayLike<CSSRule> {\n   override val length: Int\n   override fun item(index: Int): CSSRule?\n}\n@kotlin.internal.InlineOnly inline operator fun CSSRuleList.get(index: Int): CSSRule? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [CSSRule](https://developer.mozilla.org/en/docs/Web/API/CSSRule) to Kotlin\n */\npublic external abstract class CSSRule {\n   open val type: Short\n   open var cssText: String\n   open val parentRule: CSSRule?\n   open val parentStyleSheet: CSSStyleSheet?\n\n   companion object {\n   val STYLE_RULE: Short\n   val CHARSET_RULE: Short\n   val IMPORT_RULE: Short\n   val MEDIA_RULE: Short\n   val FONT_FACE_RULE: Short\n   val PAGE_RULE: Short\n   val MARGIN_RULE: Short\n   val NAMESPACE_RULE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [CSSStyleRule](https://developer.mozilla.org/en/docs/Web/API/CSSStyleRule) to Kotlin\n */\npublic external abstract class CSSStyleRule : CSSRule {\n   open var selectorText: String\n   open val style: CSSStyleDeclaration\n}\n\npublic external abstract class CSSImportRule : CSSRule {\n   open val href: String\n   open val media: MediaList\n   open val styleSheet: CSSStyleSheet\n}\n\n/**\n * Exposes the JavaScript [CSSGroupingRule](https://developer.mozilla.org/en/docs/Web/API/CSSGroupingRule) to Kotlin\n */\npublic external abstract class CSSGroupingRule : CSSRule {\n   open val cssRules: CSSRuleList\n   fun insertRule(rule: String, index: Int): Int\n   fun deleteRule(index: Int): Unit\n}\n\n/**\n * Exposes the JavaScript [CSSMediaRule](https://developer.mozilla.org/en/docs/Web/API/CSSMediaRule) to Kotlin\n */\npublic external abstract class CSSMediaRule : CSSGroupingRule {\n   open val media: MediaList\n}\n\n/**\n * Exposes the JavaScript [CSSPageRule](https://developer.mozilla.org/en/docs/Web/API/CSSPageRule) to Kotlin\n */\npublic external abstract class CSSPageRule : CSSGroupingRule {\n   open var selectorText: String\n   open val style: CSSStyleDeclaration\n}\n\npublic external abstract class CSSMarginRule : CSSRule {\n   open val name: String\n   open val style: CSSStyleDeclaration\n}\n\n/**\n * Exposes the JavaScript [CSSNamespaceRule](https://developer.mozilla.org/en/docs/Web/API/CSSNamespaceRule) to Kotlin\n */\npublic external abstract class CSSNamespaceRule : CSSRule {\n   open val namespaceURI: String\n   open val prefix: String\n}\n\npublic external interface ElementCSSInlineStyle {\n   val style: CSSStyleDeclaration\n}\n\n/**\n * Exposes the JavaScript [CSS](https://developer.mozilla.org/en/docs/Web/API/CSS) to Kotlin\n */\npublic external abstract class CSS {\n\n   companion object {\n   fun escape(ident: String): String\n   }\n}\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.dom.events\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport

org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [UIEvent](https://developer.mozilla.org/en/docs/Web/API/UIEvent) to Kotlin\n */\npublic external open class UIEvent(type: String, eventInitDict: UIEventInit = definedExternally) : Event {\n   open val view: Window?\n   open val detail: Int\n}\n\npublic external interface UIEventInit : EventInit {\n   var view: Window? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var detail: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun UIEventInit(view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): UIEventInit {\n   val o = js(\"({})\")\n\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [FocusEvent](https://developer.mozilla.org/en/docs/Web/API/FocusEvent) to Kotlin\n */\npublic external open class FocusEvent(type: String, eventInitDict: FocusEventInit = definedExternally) : UIEvent {\n   open val relatedTarget: EventTarget?\n}\n\npublic external interface FocusEventInit : UIEventInit {\n   var relatedTarget: EventTarget? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun FocusEventInit(relatedTarget: EventTarget? = null, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): FocusEventInit {\n   val o = js(\"({})\")\n\n   o[\"relatedTarget\"] = relatedTarget\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [MouseEvent](https://developer.mozilla.org/en/docs/Web/API/MouseEvent) to Kotlin\n */\npublic external open class MouseEvent(type: String, eventInitDict: MouseEventInit = definedExternally) : UIEvent, UnionElementOrMouseEvent {\n   open val region: String?\n   open val screenX: Int\n   open val screenY: Int\n   open val pageX: Double\n   open val pageY: Double\n   open val clientX: Int\n   open val clientY: Int\n   open val offsetX: Double\n   open val offsetY: Double\n   open val ctrlKey: Boolean\n   open val shiftKey: Boolean\n   open val altKey: Boolean\n   open val metaKey: Boolean\n   open val button: Short\n   open val buttons: Short\n   open val relatedTarget: EventTarget?\n   fun getModifierState(keyArg: String): Boolean\n}\n\npublic external interface MouseEventInit : EventModifierInit {\n   var screenX: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var screenY: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var clientX: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var clientY: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var button: Short? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var buttons: Short? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var relatedTarget: EventTarget? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun MouseEventInit(screenX: Int? = 0, screenY: Int? = 0, clientX: Int? = 0, clientY: Int? = 0, button: Short? = 0, buttons: Short? = 0, relatedTarget: EventTarget? = null, ctrlKey: Boolean? = false, shiftKey: Boolean? = false, altKey: Boolean? = false, metaKey: Boolean? = false, modifierAltGraph: Boolean? = false, modifierCapsLock: Boolean? = false, modifierFn: Boolean? = false, modifierFnLock: Boolean? = false, modifierHyper: Boolean? = false, modifierNumLock: Boolean? = false, modifierScrollLock: Boolean? = false, modifierSuper: Boolean? = false, modifierSymbol: Boolean? = false, modifierSymbolLock: Boolean? = false, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): MouseEventInit {\n   val o = js(\"({})\")\n\n   o[\"screenX\"] = screenX\n   o[\"screenY\"] = screenY\n   o[\"clientX\"] = clientX\n   o[\"clientY\"] = clientY\n   o[\"button\"] = button\n   o[\"buttons\"] = buttons\n   o[\"relatedTarget\"] = relatedTarget\n   o[\"ctrlKey\"] = ctrlKey\n   o[\"shiftKey\"] = shiftKey\n   o[\"altKey\"] = altKey\n   o[\"metaKey\"] = metaKey\n   o[\"modifierAltGraph\"] = modifierAltGraph\n   o[\"modifierCapsLock\"] = modifierCapsLock\n   o[\"modifierFn\"] = modifierFn\n   o[\"modifierFnLock\"] = modifierFnLock\n   o[\"modifierHyper\"] = modifierHyper\n   o[\"modifierNumLock\"] = modifierNumLock\n   o[\"modifierScrollLock\"] = modifierScrollLock\n   o[\"modifierSuper\"] = modifierSuper\n   o[\"modifierSymbol\"] = modifierSymbol\n   o[\"modifierSymbolLock\"] = modifierSymbolLock\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n

o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\npublic external interface EventModifierInit : UIEventInit {\n   var ctrlKey: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var shiftKey: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var altKey: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var metaKey: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierAltGraph: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierCapsLock: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierFn: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierFnLock: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierHyper: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierNumLock: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierScrollLock: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierSuper: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierSymbol: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var modifierSymbolLock: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun EventModifierInit(ctrlKey: Boolean? = false, shiftKey: Boolean? = false, altKey: Boolean? = false, metaKey: Boolean? = false, modifierAltGraph: Boolean? = false, modifierCapsLock: Boolean? = false, modifierFn: Boolean? = false, modifierFnLock: Boolean? = false, modifierHyper: Boolean? = false, modifierNumLock: Boolean? = false, modifierScrollLock: Boolean? = false, modifierSuper: Boolean? = false, modifierSymbol: Boolean? = false, modifierSymbolLock: Boolean? = false, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): EventModifierInit {\n   val o = js(\"({})\")\n\n   o[\"ctrlKey\"] = ctrlKey\n   o[\"shiftKey\"] = shiftKey\n   o[\"altKey\"] = altKey\n   o[\"metaKey\"] = metaKey\n   o[\"modifierAltGraph\"] = modifierAltGraph\n   o[\"modifierCapsLock\"] = modifierCapsLock\n   o[\"modifierFn\"] = modifierFn\n   o[\"modifierFnLock\"] = modifierFnLock\n   o[\"modifierHyper\"] = modifierHyper\n   o[\"modifierNumLock\"] = modifierNumLock\n   o[\"modifierScrollLock\"] = modifierScrollLock\n   o[\"modifierSuper\"] = modifierSuper\n   o[\"modifierSymbol\"] = modifierSymbol\n   o[\"modifierSymbolLock\"] = modifierSymbolLock\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [WheelEvent](https://developer.mozilla.org/en/docs/Web/API/WheelEvent) to Kotlin\n */\npublic external open class WheelEvent(type: String, eventInitDict: WheelEventInit = definedExternally) : MouseEvent {\n   open val deltaX: Double\n   open val deltaY: Double\n   open val deltaZ: Double\n   open val deltaMode: Int\n\n   companion object {\n   val DOM_DELTA_PIXEL: Int\n   val DOM_DELTA_LINE: Int\n   val DOM_DELTA_PAGE: Int\n   }\n}\n\npublic external interface WheelEventInit : MouseEventInit {\n   var deltaX: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var deltaY: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var deltaZ: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var deltaMode: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun WheelEventInit(deltaX: Double? = 0.0, deltaY: Double? = 0.0, deltaZ: Double? = 0.0, deltaMode: Int? = 0, screenX: Int? = 0, screenY: Int? = 0, clientX: Int? = 0, clientY: Int? = 0, button: Short? = 0, buttons: Short? = 0, relatedTarget: EventTarget? = null, ctrlKey: Boolean? = false, shiftKey: Boolean? = false, altKey: Boolean? = false, metaKey: Boolean? = false, modifierAltGraph: Boolean? = false, modifierCapsLock: Boolean? = false, modifierFn: Boolean? = false, modifierFnLock: Boolean? = false, modifierHyper: Boolean? = false, modifierNumLock: Boolean? = false, modifierScrollLock: Boolean? = false, modifierSuper: Boolean? = false, modifierSymbol: Boolean? = false, modifierSymbolLock: Boolean? = false, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): WheelEventInit {\n   val o = js(\"({})\")\n\n   o[\"deltaX\"] = deltaX\n   o[\"deltaY\"] = deltaY\n   o[\"deltaZ\"] = deltaZ\n   o[\"deltaMode\"] = deltaMode\n

o[\"screenX\"] = screenX\n   o[\"screenY\"] = screenY\n   o[\"clientX\"] = clientX\n   o[\"clientY\"] = clientY\n o[\"button\"] = button\n   o[\"buttons\"] = buttons\n   o[\"relatedTarget\"] = relatedTarget\n   o[\"ctrlKey\"] = ctrlKey\n   o[\"shiftKey\"] = shiftKey\n   o[\"altKey\"] = altKey\n   o[\"metaKey\"] = metaKey\n o[\"modifierAltGraph\"] = modifierAltGraph\n   o[\"modifierCapsLock\"] = modifierCapsLock\n o[\"modifierFn\"] = modifierFn\n   o[\"modifierFnLock\"] = modifierFnLock\n   o[\"modifierHyper\"] = modifierHyper\n   o[\"modifierNumLock\"] = modifierNumLock\n   o[\"modifierScrollLock\"] = modifierScrollLock\n   o[\"modifierSuper\"] = modifierSuper\n   o[\"modifierSymbol\"] = modifierSymbol\n o[\"modifierSymbolLock\"] = modifierSymbolLock\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [InputEvent](https://developer.mozilla.org/en/docs/Web/API/InputEvent) to Kotlin\n */\npublic external open class InputEvent(type: String, eventInitDict: InputEventInit = definedExternally) : UIEvent {\n   open val data: String\n   open val isComposing: Boolean\n}\n\npublic external interface InputEventInit : UIEventInit {\n   var data: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var isComposing: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun InputEventInit(data: String? = \"\", isComposing: Boolean? = false, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): InputEventInit {\n   val o = js(\"({})\")\n\n   o[\"data\"] = data\n o[\"isComposing\"] = isComposing\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [KeyboardEvent](https://developer.mozilla.org/en/docs/Web/API/KeyboardEvent) to Kotlin\n */\npublic external open class KeyboardEvent(type: String, eventInitDict: KeyboardEventInit = definedExternally) : UIEvent {\n open val key: String\n   open val code: String\n   open val location: Int\n   open val ctrlKey: Boolean\n   open val shiftKey: Boolean\n   open val altKey: Boolean\n   open val metaKey: Boolean\n   open val repeat: Boolean\n open val isComposing: Boolean\n   open val charCode: Int\n   open val keyCode: Int\n   open val which: Int\n fun getModifierState(keyArg: String): Boolean\n\n   companion object {\n   val DOM_KEY_LOCATION_STANDARD: Int\n   val DOM_KEY_LOCATION_LEFT: Int\n   val DOM_KEY_LOCATION_RIGHT: Int\n   val DOM_KEY_LOCATION_NUMPAD: Int\n   }\n}\n\npublic external interface KeyboardEventInit : EventModifierInit {\n   var key: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var code: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var location: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var repeat: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var isComposing: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun KeyboardEventInit(key: String? = \"\", code: String? = \"\", location: Int? = 0, repeat: Boolean? = false, isComposing: Boolean? = false, ctrlKey: Boolean? = false, shiftKey: Boolean? = false, altKey: Boolean? = false, metaKey: Boolean? = false, modifierAltGraph: Boolean? = false, modifierCapsLock: Boolean? = false, modifierFn: Boolean? = false, modifierFnLock: Boolean? = false, modifierHyper: Boolean? = false, modifierNumLock: Boolean? = false, modifierScrollLock: Boolean? = false, modifierSuper: Boolean? = false, modifierSymbol: Boolean? = false, modifierSymbolLock: Boolean? = false, view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): KeyboardEventInit {\n   val o = js(\"({})\")\n\n   o[\"key\"] = key\n   o[\"code\"] = code\n   o[\"location\"] = location\n   o[\"repeat\"] = repeat\n o[\"isComposing\"] = isComposing\n   o[\"ctrlKey\"] = ctrlKey\n   o[\"shiftKey\"] = shiftKey\n   o[\"altKey\"] = altKey\n   o[\"metaKey\"] = metaKey\n   o[\"modifierAltGraph\"] = modifierAltGraph\n o[\"modifierCapsLock\"] = modifierCapsLock\n   o[\"modifierFn\"] = modifierFn\n   o[\"modifierFnLock\"] = modifierFnLock\n   o[\"modifierHyper\"] = modifierHyper\n   o[\"modifierNumLock\"] = modifierNumLock\n o[\"modifierScrollLock\"] = modifierScrollLock\n   o[\"modifierSuper\"] = modifierSuper\n o[\"modifierSymbol\"] = modifierSymbol\n   o[\"modifierSymbolLock\"] = modifierSymbolLock\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] =

composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [CompositionEvent](https://developer.mozilla.org/en/docs/Web/API/CompositionEvent) to Kotlin\n */\npublic external open class CompositionEvent(type: String, eventInitDict: CompositionEventInit = definedExternally) : UIEvent {\n   open val data: String\n}\n\npublic external interface CompositionEventInit : UIEventInit {\n   var data: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CompositionEventInit(data: String? = \"\", view: Window? = null, detail: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): CompositionEventInit {\n   val o = js(\"({})\")\n\n   o[\"data\"] = data\n   o[\"view\"] = view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [Event](https://developer.mozilla.org/en/docs/Web/API/Event) to Kotlin\n */\npublic external open class Event(type: String, eventInitDict: EventInit = definedExternally) {\n   open val type: String\n   open val target: EventTarget?\n   open val currentTarget: EventTarget?\n   open val eventPhase: Short\n   open val bubbles: Boolean\n   open val cancelable: Boolean\n   open val defaultPrevented: Boolean\n   open val composed: Boolean\n   open val isTrusted: Boolean\n   open val timeStamp: Number\n   fun composedPath(): Array<EventTarget>\n   fun stopPropagation(): Unit\n   fun stopImmediatePropagation(): Unit\n   fun preventDefault(): Unit\n   fun initEvent(type: String, bubbles: Boolean, cancelable: Boolean): Unit\n   companion object {\n   val NONE: Short\n   val CAPTURING_PHASE: Short\n   val AT_TARGET: Short\n   val BUBBLING_PHASE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [EventTarget](https://developer.mozilla.org/en/docs/Web/API/EventTarget) to Kotlin\n */\npublic external abstract class EventTarget {\n   fun addEventListener(type: String, callback: EventListener?, options: dynamic = definedExternally): Unit\n   fun addEventListener(type: String, callback: ((Event) -> Unit)?, options: dynamic = definedExternally): Unit\n   fun removeEventListener(type: String, callback: EventListener?, options: dynamic = definedExternally): Unit\n   fun removeEventListener(type: String, callback: ((Event) -> Unit)?, options: dynamic = definedExternally): Unit\n   fun dispatchEvent(event: Event): Boolean\n}\n\n/**\n * Exposes the JavaScript [EventListener](https://developer.mozilla.org/en/docs/Web/API/EventListener) to Kotlin\n */\npublic external interface EventListener {\n   fun handleEvent(event: Event): Unit\n}\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.dom\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [Document](https://developer.mozilla.org/en/docs/Web/API/Document) to Kotlin\n */\npublic external open class Document : Node, GlobalEventHandlers, DocumentAndElementEventHandlers, NonElementParentNode, DocumentOrShadowRoot, ParentNode, GeometryUtils {\n   open val fullscreenEnabled: Boolean\n   open val fullscreen: Boolean\n   var onfullscreenchange: ((Event) -> dynamic)?\n   var onfullscreenerror: ((Event) -> dynamic)?\n   open val rootElement: SVGSVGElement?\n   var title: String\n   open val referrer: String\n   var domain: String\n   open val activeElement: Element?\n   open val location: Location?\n   var cookie: String\n   open val lastModified: String\n   open val readyState: DocumentReadyState\n   var dir: String\n   var body: HTMLElement?\n   open val head: HTMLHeadElement?\n   open val images: HTMLCollection\n   open val embeds: HTMLCollection\n   open val plugins: HTMLCollection\n   open val links: HTMLCollection\n   open val forms: HTMLCollection\n   open val scripts: HTMLCollection\n   open val currentScript: HTMLOrSVGScriptElement?\n   open val defaultView: Window?\n   var designMode: String\n   var onreadystatechange: ((Event) -> dynamic)?\n   var fgColor: String\n   var linkColor: String\n   var vlinkColor: String\n   var alinkColor: String\n   var bgColor: String\n   open val anchors: HTMLCollection\n   open val applets: HTMLCollection\n   open val all: HTMLAllCollection\n   open val implementation: DOMImplementation\n   open val URL: String\n   open val documentURI: String\n   open val origin: String\n

open val compatMode: String\n   open val characterSet: String\n   open val charset: String\n   open val inputEncoding: String\n   open val contentType: String\n   open val doctype: DocumentType?\n   open val documentElement: Element?\n   open val scrollingElement: Element?\n   open val styleSheets: StyleSheetList\n   override var onabort: ((Event) -> dynamic)?\n   override var onblur: ((Event) -> dynamic)?\n   override var oncancel: ((Event) -> dynamic)?\n   override var oncanplay: ((Event) -> dynamic)?\n   override var oncanplaythrough: ((Event) -> dynamic)?\n   override var onchange: ((Event) -> dynamic)?\n   override var onclick: ((Event) -> dynamic)?\n   override var onclose: ((Event) -> dynamic)?\n   override var oncontextmenu: ((Event) -> dynamic)?\n   override var oncuechange: ((Event) -> dynamic)?\n   override var ondblclick: ((Event) -> dynamic)?\n   override var ondrag: ((Event) -> dynamic)?\n   override var ondragend: ((Event) -> dynamic)?\n   override var ondragenter: ((Event) -> dynamic)?\n   override var ondragexit: ((Event) -> dynamic)?\n   override var ondragleave: ((Event) -> dynamic)?\n   override var ondragover: ((Event) -> dynamic)?\n   override var ondragstart: ((Event) -> dynamic)?\n   override var ondrop: ((Event) -> dynamic)?\n   override var ondurationchange: ((Event) -> dynamic)?\n   override var onemptied: ((Event) -> dynamic)?\n   override var onended: ((Event) -> dynamic)?\n   override var onerror: ((dynamic, String, Int, Int, Any?) -> dynamic)?\n   override var onfocus: ((Event) -> dynamic)?\n   override var oninput: ((Event) -> dynamic)?\n   override var oninvalid: ((Event) -> dynamic)?\n   override var onkeydown: ((Event) -> dynamic)?\n   override var onkeypress: ((Event) -> dynamic)?\n   override var onkeyup: ((Event) -> dynamic)?\n   override var onload: ((Event) -> dynamic)?\n   override var onloadeddata: ((Event) -> dynamic)?\n   override var onloadedmetadata: ((Event) -> dynamic)?\n   override var onloadend: ((Event) -> dynamic)?\n   override var onloadstart: ((Event) -> dynamic)?\n   override var onmousedown: ((Event) -> dynamic)?\n   override var onmouseenter: ((Event) -> dynamic)?\n   override var onmouseleave: ((Event) -> dynamic)?\n   override var onmousemove: ((Event) -> dynamic)?\n   override var onmouseout: ((Event) -> dynamic)?\n   override var onmouseover: ((Event) -> dynamic)?\n   override var onmouseup: ((Event) -> dynamic)?\n   override var onwheel: ((Event) -> dynamic)?\n   override var onpause: ((Event) -> dynamic)?\n   override var onplay: ((Event) -> dynamic)?\n   override var onplaying: ((Event) -> dynamic)?\n   override var onprogress: ((Event) -> dynamic)?\n   override var onratechange: ((Event) -> dynamic)?\n   override var onreset: ((Event) -> dynamic)?\n   override var onresize: ((Event) -> dynamic)?\n   override var onscroll: ((Event) -> dynamic)?\n   override var onseeked: ((Event) -> dynamic)?\n   override var onseeking: ((Event) -> dynamic)?\n   override var onselect: ((Event) -> dynamic)?\n   override var onshow: ((Event) -> dynamic)?\n   override var onstalled: ((Event) -> dynamic)?\n   override var onsubmit: ((Event) -> dynamic)?\n   override var onsuspend: ((Event) -> dynamic)?\n   override var ontimeupdate: ((Event) -> dynamic)?\n   override var ontoggle: ((Event) -> dynamic)?\n   override var onvolumechange: ((Event) -> dynamic)?\n   override var onwaiting: ((Event) -> dynamic)?\n   override var oncopy: ((Event) -> dynamic)?\n   override var oncut: ((Event) -> dynamic)?\n   override var onpaste: ((Event) -> dynamic)?\n   override val fullscreenElement: Element?\n   override val children: HTMLCollection\n   override val firstElementChild: Element?\n   override val lastElementChild: Element?\n   override val childElementCount: Int\n   fun exitFullscreen(): Promise<Unit>\n   fun getElementsByName(elementName: String): NodeList\n   fun open(type: String = definedExternally, replace: String = definedExternally): Document\n   fun open(url: String, name: String, features: String): Window\n   fun close(): Unit\n   fun write(vararg text: String): Unit\n   fun writeln(vararg text: String): Unit\n   fun hasFocus(): Boolean\n   fun execCommand(commandId: String, showUI: Boolean = definedExternally, value: String = definedExternally): Boolean\n   fun queryCommandEnabled(commandId: String): Boolean\n   fun queryCommandIndeterm(commandId: String): Boolean\n   fun queryCommandState(commandId: String): Boolean\n   fun queryCommandSupported(commandId: String): Boolean\n   fun queryCommandValue(commandId: String): String\n   fun clear(): Unit\n   fun captureEvents(): Unit\n   fun releaseEvents(): Unit\n   fun getElementsByTagName(qualifiedName: String): HTMLCollection\n   fun getElementsByTagNameNS(namespace: String?, localName: String): HTMLCollection\n   fun getElementsByClassName(classNames: String): HTMLCollection\n   fun createElement(localName: String, options: ElementCreationOptions = definedExternally): Element\n   fun createElementNS(namespace: String?, qualifiedName: String, options: ElementCreationOptions = definedExternally): Element\n   fun

createDocumentFragment(): DocumentFragment\n   fun createTextNode(data: String): Text\n   fun createCDATASection(data: String): CDATASection\n   fun createComment(data: String): Comment\n   fun createProcessingInstruction(target: String, data: String): ProcessingInstruction\n   fun importNode(node: Node, deep: Boolean = definedExternally): Node\n   fun adoptNode(node: Node): Node\n   fun createAttribute(localName: String): Attr\n   fun createAttributeNS(namespace: String?, qualifiedName: String): Attr\n   fun createEvent(interface_: String): Event\n   fun createRange(): Range\n   fun createNodeIterator(root: Node, whatToShow: Int = definedExternally, filter: NodeFilter? = definedExternally): NodeIterator\n   fun createNodeIterator(root: Node, whatToShow: Int = definedExternally, filter: ((Node) -> Short)? = definedExternally): NodeIterator\n   fun createTreeWalker(root: Node, whatToShow: Int = definedExternally, filter: NodeFilter? = definedExternally): TreeWalker\n   fun createTreeWalker(root: Node, whatToShow: Int = definedExternally, filter: ((Node) -> Short)? = definedExternally): TreeWalker\n   fun elementFromPoint(x: Double, y: Double): Element?\n   fun elementsFromPoint(x: Double, y: Double): Array<Element>\n   fun caretPositionFromPoint(x: Double, y: Double): CaretPosition?\n   override fun getElementById(elementId: String): Element?\n   override fun prepend(vararg nodes: dynamic): Unit\n   override fun append(vararg nodes: dynamic): Unit\n   override fun querySelector(selectors: String): Element?\n   override fun querySelectorAll(selectors: String): NodeList\n   override fun getBoxQuads(options: BoxQuadOptions /* = definedExternally */): Array<DOMQuad>\n   override fun convertQuadFromNode(quad: dynamic, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertRectFromNode(rect: DOMRectReadOnly, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertPointFromNode(point: DOMPointInit, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMPoint\n}\n@kotlin.internal.InlineOnly inline operator fun Document.get(name: String): dynamic = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [Window](https://developer.mozilla.org/en/docs/Web/API/Window) to Kotlin\n */\npublic external abstract class Window : EventTarget, GlobalEventHandlers, WindowEventHandlers, WindowOrWorkerGlobalScope, WindowSessionStorage, WindowLocalStorage, GlobalPerformance, UnionMessagePortOrWindow {\n   override val performance: Performance\n   open val window: Window\n   open val self: Window\n   open val document: Document\n   open var name: String\n   open val location: Location\n   open val history: History\n   open val customElements: CustomElementRegistry\n   open val locationbar: BarProp\n   open val menubar: BarProp\n   open val personalbar: BarProp\n   open val scrollbars: BarProp\n   open val statusbar: BarProp\n   open val toolbar: BarProp\n   open var status: String\n   open val closed: Boolean\n   open val frames: Window\n   open val length: Int\n   open val top: Window\n   open var opener: Any?\n   open val parent: Window\n   open val frameElement: Element?\n   open val navigator: Navigator\n   open val applicationCache: ApplicationCache\n   open val external: External\n   open val screen: Screen\n   open val innerWidth: Int\n   open val innerHeight: Int\n   open val scrollX: Double\n   open val pageXOffset: Double\n   open val scrollY: Double\n   open val pageYOffset: Double\n   open val screenX: Int\n   open val screenY: Int\n   open val outerWidth: Int\n   open val outerHeight: Int\n   open val devicePixelRatio: Double\n   fun close(): Unit\n   fun stop(): Unit\n   fun focus(): Unit\n   fun blur(): Unit\n   fun open(url: String = definedExternally, target: String = definedExternally, features: String = definedExternally): Window?\n   fun alert(): Unit\n   fun alert(message: String): Unit\n   fun confirm(message: String = definedExternally): Boolean\n   fun prompt(message: String = definedExternally, default: String = definedExternally): String?\n   fun print(): Unit\n   fun requestAnimationFrame(callback: (Double) -> Unit): Int\n   fun cancelAnimationFrame(handle: Int): Unit\n   fun postMessage(message: Any?, targetOrigin: String, transfer: Array<dynamic> = definedExternally): Unit\n   fun captureEvents(): Unit\n   fun releaseEvents(): Unit\n   fun matchMedia(query: String): MediaQueryList\n   fun moveTo(x: Int, y: Int): Unit\n   fun moveBy(x: Int, y: Int): Unit\n   fun resizeTo(x: Int, y: Int): Unit\n   fun resizeBy(x: Int, y: Int): Unit\n   fun scroll(options: ScrollToOptions = definedExternally): Unit\n   fun scroll(x: Double, y: Double): Unit\n   fun scrollTo(options: ScrollToOptions = definedExternally): Unit\n   fun scrollTo(x: Double, y: Double): Unit\n   fun scrollBy(options: ScrollToOptions = definedExternally): Unit\n   fun scrollBy(x: Double, y: Double): Unit\n   fun getComputedStyle(elt: Element, pseudoElt: String? = definedExternally):

CSSStyleDeclaration\n}\n@kotlin.internal.InlineOnly inline operator fun Window.get(name: String): dynamic = asDynamic()[name]\n\npublic external abstract class HTMLAllCollection {\n   open val length: Int\n//   fun namedItem(name: String): UnionElementOrHTMLCollection?\n   fun item(nameOrIndex: String = definedExternally): UnionElementOrHTMLCollection?\n}\n//@kotlin.internal.InlineOnly inline operator fun HTMLAllCollection.get(index: Int): Element? = asDynamic()[index]\n//@kotlin.internal.InlineOnly inline operator fun HTMLAllCollection.get(name: String): UnionElementOrHTMLCollection? = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [HTMLFormControlsCollection](https://developer.mozilla.org/en/docs/Web/API/HTMLFormControlsCollection) to Kotlin\n */\npublic external abstract class HTMLFormControlsCollection : HTMLCollection {\n//   override fun namedItem(name: String): UnionElementOrRadioNodeList?\n}\n//@kotlin.internal.InlineOnly override inline operator fun HTMLFormControlsCollection.get(name: String): UnionElementOrRadioNodeList? = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [RadioNodeList](https://developer.mozilla.org/en/docs/Web/API/RadioNodeList) to Kotlin\n */\npublic external abstract class RadioNodeList : NodeList, UnionElementOrRadioNodeList {\n   open var value: String\n}\n\n/**\n * Exposes the JavaScript [HTMLOptionsCollection](https://developer.mozilla.org/en/docs/Web/API/HTMLOptionsCollection) to Kotlin\n */\npublic external abstract class HTMLOptionsCollection : HTMLCollection {\n   override var length: Int\n   open var selectedIndex: Int\n   fun add(element: UnionHTMLOptGroupElementOrHTMLOptionElement, before: dynamic = definedExternally): Unit\n   fun remove(index: Int): Unit\n}\n@kotlin.internal.InlineOnly inline operator fun HTMLOptionsCollection.set(index: Int, option: HTMLOptionElement?): Unit { asDynamic()[index] = option; }\n\n/**\n * Exposes the JavaScript [HTMLElement](https://developer.mozilla.org/en/docs/Web/API/HTMLElement) to Kotlin\n */\npublic external abstract class HTMLElement : Element, ElementCSSInlineStyle, GlobalEventHandlers, DocumentAndElementEventHandlers, ElementContentEditable {\n   open var title: String\n   open var lang: String\n   open var translate: Boolean\n   open var dir: String\n   open val dataset: DOMStringMap\n   open var hidden: Boolean\n   open var tabIndex: Int\n   open var accessKey: String\n   open val accessKeyLabel: String\n   open var draggable: Boolean\n   open val dropzone: DOMTokenList\n   open var contextMenu: HTMLMenuElement?\n   open var spellcheck: Boolean\n   open var innerText: String\n   open val offsetParent: Element?\n   open val offsetTop: Int\n   open val offsetLeft: Int\n   open val offsetWidth: Int\n   open val offsetHeight: Int\n   fun click(): Unit\n   fun focus(): Unit\n   fun blur(): Unit\n   fun forceSpellCheck(): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLUnknownElement](https://developer.mozilla.org/en/docs/Web/API/HTMLUnknownElement) to Kotlin\n */\npublic external abstract class HTMLUnknownElement : HTMLElement {\n}\n\n/**\n * Exposes the JavaScript [DOMStringMap](https://developer.mozilla.org/en/docs/Web/API/DOMStringMap) to Kotlin\n */\npublic external abstract class DOMStringMap {\n}\n@kotlin.internal.InlineOnly inline operator fun DOMStringMap.get(name: String): String? = asDynamic()[name]\n@kotlin.internal.InlineOnly inline operator fun DOMStringMap.set(name: String, value: String): Unit { asDynamic()[name] = value; }\n\n/**\n * Exposes the JavaScript [HTMLHtmlElement](https://developer.mozilla.org/en/docs/Web/API/HTMLHtmlElement) to Kotlin\n */\npublic external abstract class HTMLHtmlElement : HTMLElement {\n   open var version: String\n}\n\n/**\n * Exposes the JavaScript [HTMLHeadElement](https://developer.mozilla.org/en/docs/Web/API/HTMLHeadElement) to Kotlin\n */\npublic external abstract class HTMLHeadElement : HTMLElement {\n}\n\n/**\n * Exposes the JavaScript [HTMLTitleElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTitleElement) to Kotlin\n */\npublic external abstract class HTMLTitleElement : HTMLElement {\n   open var text: String\n}\n\n/**\n * Exposes the JavaScript [HTMLBaseElement](https://developer.mozilla.org/en/docs/Web/API/HTMLBaseElement) to Kotlin\n */\npublic external abstract class HTMLBaseElement : HTMLElement {\n   open var href: String\n   open var target: String\n}\n\n/**\n * Exposes the JavaScript [HTMLLinkElement](https://developer.mozilla.org/en/docs/Web/API/HTMLLinkElement) to Kotlin\n */\npublic external abstract class HTMLLinkElement : HTMLElement, LinkStyle {\n   open var scope: String\n   open var

workerType: WorkerType\n   open var href: String\n   open var crossOrigin: String?\n   open var rel: String\n @JsName(\"as\") open var as_: RequestDestination\n   open val relList: DOMTokenList\n   open var media: String\n   open var nonce: String\n   open var hreflang: String\n   open var type: String\n   open val sizes: DOMTokenList\n   open var referrerPolicy: String\n   open var charset: String\n   open var rev: String\n   open var target: String\n}\n\n/**\n * Exposes the JavaScript [HTMLMetaElement](https://developer.mozilla.org/en/docs/Web/API/HTMLMetaElement) to Kotlin\n */\npublic external abstract class HTMLMetaElement : HTMLElement {\n   open var name: String\n   open var httpEquiv: String\n   open var content: String\n   open var scheme: String\n}\n\n/**\n * Exposes the JavaScript [HTMLStyleElement](https://developer.mozilla.org/en/docs/Web/API/HTMLStyleElement) to Kotlin\n */\npublic external abstract class HTMLStyleElement : HTMLElement, LinkStyle {\n   open var media: String\n   open var nonce: String\n   open var type: String\n}\n\n/**\n * Exposes the JavaScript [HTMLBodyElement](https://developer.mozilla.org/en/docs/Web/API/HTMLBodyElement) to Kotlin\n */\npublic external abstract class HTMLBodyElement : HTMLElement, WindowEventHandlers {\n   open var text: String\n   open var link: String\n   open var vLink: String\n   open var aLink: String\n   open var bgColor: String\n   open var background: String\n}\n\n/**\n * Exposes the JavaScript [HTMLHeadingElement](https://developer.mozilla.org/en/docs/Web/API/HTMLHeadingElement) to Kotlin\n */\npublic external abstract class HTMLHeadingElement : HTMLElement {\n   open var align: String\n}\n\n/**\n * Exposes the JavaScript [HTMLParagraphElement](https://developer.mozilla.org/en/docs/Web/API/HTMLParagraphElement) to Kotlin\n */\npublic external abstract class HTMLParagraphElement : HTMLElement {\n   open var align: String\n}\n\n/**\n * Exposes the JavaScript [HTMLHRElement](https://developer.mozilla.org/en/docs/Web/API/HTMLHRElement) to Kotlin\n */\npublic external abstract class HTMLHRElement : HTMLElement {\n   open var align: String\n   open var color: String\n   open var noShade: Boolean\n   open var size: String\n   open var width: String\n}\n\n/**\n * Exposes the JavaScript [HTMLPreElement](https://developer.mozilla.org/en/docs/Web/API/HTMLPreElement) to Kotlin\n */\npublic external abstract class HTMLPreElement : HTMLElement {\n   open var width: Int\n}\n\n/**\n * Exposes the JavaScript [HTMLQuoteElement](https://developer.mozilla.org/en/docs/Web/API/HTMLQuoteElement) to Kotlin\n */\npublic external abstract class HTMLQuoteElement : HTMLElement {\n   open var cite: String\n}\n\n/**\n * Exposes the JavaScript [HTMLOListElement](https://developer.mozilla.org/en/docs/Web/API/HTMLOListElement) to Kotlin\n */\npublic external abstract class HTMLOListElement : HTMLElement {\n   open var reversed: Boolean\n   open var start: Int\n   open var type: String\n   open var compact: Boolean\n}\n\n/**\n * Exposes the JavaScript [HTMLUListElement](https://developer.mozilla.org/en/docs/Web/API/HTMLUListElement) to Kotlin\n */\npublic external abstract class HTMLUListElement : HTMLElement {\n   open var compact: Boolean\n   open var type: String\n}\n\n/**\n * Exposes the JavaScript [HTMLLIElement](https://developer.mozilla.org/en/docs/Web/API/HTMLLIElement) to Kotlin\n */\npublic external abstract class HTMLLIElement : HTMLElement {\n   open var value: Int\n   open var type: String\n}\n\n/**\n * Exposes the JavaScript [HTMLDListElement](https://developer.mozilla.org/en/docs/Web/API/HTMLDListElement) to Kotlin\n */\npublic external abstract class HTMLDListElement : HTMLElement {\n   open var compact: Boolean\n}\n\n/**\n * Exposes the JavaScript [HTMLDivElement](https://developer.mozilla.org/en/docs/Web/API/HTMLDivElement) to Kotlin\n */\npublic external abstract class HTMLDivElement : HTMLElement {\n   open var align: String\n}\n\n/**\n * Exposes the JavaScript [HTMLAnchorElement](https://developer.mozilla.org/en/docs/Web/API/HTMLAnchorElement) to Kotlin\n */\npublic external abstract class HTMLAnchorElement : HTMLElement, HTMLHyperlinkElementUtils {\n   open var target: String\n   open var download: String\n   open var ping: String\n   open var rel: String\n   open val relList: DOMTokenList\n   open var hreflang: String\n   open var type: String\n   open var text: String\n   open var referrerPolicy: String\n   open var coords: String\n   open var charset: String\n   open var name: String\n

open var rev: String\n   open var shape: String\n}\n\n/**\n * Exposes the JavaScript [HTMLDataElement](https://developer.mozilla.org/en/docs/Web/API/HTMLDataElement) to Kotlin\n */\npublic external abstract class HTMLDataElement : HTMLElement {\n   open var value: String\n}\n\n/**\n * Exposes the JavaScript [HTMLTimeElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTimeElement) to Kotlin\n */\npublic external abstract class HTMLTimeElement : HTMLElement {\n   open var dateTime: String\n}\n\n/**\n * Exposes the JavaScript [HTMLSpanElement](https://developer.mozilla.org/en/docs/Web/API/HTMLSpanElement) to Kotlin\n */\npublic external abstract class HTMLSpanElement : HTMLElement {\n}\n\n/**\n * Exposes the JavaScript [HTMLBRElement](https://developer.mozilla.org/en/docs/Web/API/HTMLBRElement) to Kotlin\n */\npublic external abstract class HTMLBRElement : HTMLElement {\n   open var clear: String\n}\n\n/**\n * Exposes the JavaScript [HTMLHyperlinkElementUtils](https://developer.mozilla.org/en/docs/Web/API/HTMLHyperlinkElementUtils) to Kotlin\n */\npublic external interface HTMLHyperlinkElementUtils {\n   var href: String\n   val origin: String\n   var protocol: String\n   var username: String\n   var password: String\n   var host: String\n   var hostname: String\n   var port: String\n   var pathname: String\n   var search: String\n   var hash: String\n}\n\n/**\n * Exposes the JavaScript [HTMLModElement](https://developer.mozilla.org/en/docs/Web/API/HTMLModElement) to Kotlin\n */\npublic external abstract class HTMLModElement : HTMLElement {\n   open var cite: String\n   open var dateTime: String\n}\n\n/**\n * Exposes the JavaScript [HTMLPictureElement](https://developer.mozilla.org/en/docs/Web/API/HTMLPictureElement) to Kotlin\n */\npublic external abstract class HTMLPictureElement : HTMLElement {\n}\n\n/**\n * Exposes the JavaScript [HTMLSourceElement](https://developer.mozilla.org/en/docs/Web/API/HTMLSourceElement) to Kotlin\n */\npublic external abstract class HTMLSourceElement : HTMLElement {\n   open var src: String\n   open var type: String\n   open var srcset: String\n   open var sizes: String\n   open var media: String\n}\n\n/**\n * Exposes the JavaScript [HTMLImageElement](https://developer.mozilla.org/en/docs/Web/API/HTMLImageElement) to Kotlin\n */\npublic external abstract class HTMLImageElement : HTMLElement, TexImageSource, HTMLOrSVGImageElement {\n   open var alt: String\n   open var src: String\n   open var srcset: String\n   open var sizes: String\n   open var crossOrigin: String?\n   open var useMap: String\n   open var isMap: Boolean\n   open var width: Int\n   open var height: Int\n   open val naturalWidth: Int\n   open val naturalHeight: Int\n   open val complete: Boolean\n   open val currentSrc: String\n   open var referrerPolicy: String\n   open var name: String\n   open var lowsrc: String\n   open var align: String\n   open var hspace: Int\n   open var vspace: Int\n   open var longDesc: String\n   open var border: String\n   open val x: Int\n   open val y: Int\n}\n\n/**\n * Exposes the JavaScript [HTMLIFrameElement](https://developer.mozilla.org/en/docs/Web/API/HTMLIFrameElement) to Kotlin\n */\npublic external abstract class HTMLIFrameElement : HTMLElement {\n   open var src: String\n   open var srcdoc: String\n   open var name: String\n   open val sandbox: DOMTokenList\n   open var allowFullscreen: Boolean\n   open var allowUserMedia: Boolean\n   open var width: String\n   open var height: String\n   open var referrerPolicy: String\n   open val contentDocument: Document?\n   open val contentWindow: Window?\n   open var align: String\n   open var scrolling: String\n   open var frameBorder: String\n   open var longDesc: String\n   open var marginHeight: String\n   open var marginWidth: String\n   fun getSVGDocument(): Document?\n}\n\n/**\n * Exposes the JavaScript [HTMLEmbedElement](https://developer.mozilla.org/en/docs/Web/API/HTMLEmbedElement) to Kotlin\n */\npublic external abstract class HTMLEmbedElement : HTMLElement {\n   open var src: String\n   open var type: String\n   open var width: String\n   open var height: String\n   open var align: String\n   open var name: String\n   fun getSVGDocument(): Document?\n}\n\n/**\n * Exposes the JavaScript [HTMLObjectElement](https://developer.mozilla.org/en/docs/Web/API/HTMLObjectElement) to Kotlin\n */\npublic external abstract class HTMLObjectElement : HTMLElement {\n   open var data: String\n   open var type: String\n   open var typeMustMatch: Boolean\n   open var name: String\n   open var useMap: String\n   open val form: HTMLFormElement?\n   open var width: String\n   open var height: String\n   open val contentDocument: Document?\n   open val contentWindow: Window?\n   open val willValidate: Boolean\n   open

val validity: ValidityState\n   open val validationMessage: String\n   open var align: String\n   open var archive: String\n   open var code: String\n   open var declare: Boolean\n   open var hspace: Int\n   open var standby: String\n   open var vspace: Int\n   open var codeBase: String\n   open var codeType: String\n   open var border: String\n   fun getSVGDocument(): Document?\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLParamElement](https://developer.mozilla.org/en/docs/Web/API/HTMLParamElement) to Kotlin\n */\npublic external abstract class HTMLParamElement : HTMLElement {\n   open var name: String\n   open var value: String\n   open var type: String\n   open var valueType: String\n}\n\n/**\n * Exposes the JavaScript [HTMLVideoElement](https://developer.mozilla.org/en/docs/Web/API/HTMLVideoElement) to Kotlin\n */\npublic external abstract class HTMLVideoElement : HTMLMediaElement, TexImageSource {\n   open var width: Int\n   open var height: Int\n   open val videoWidth: Int\n   open val videoHeight: Int\n   open var poster: String\n   open var playsInline: Boolean\n}\n\n/**\n * Exposes the JavaScript [HTMLAudioElement](https://developer.mozilla.org/en/docs/Web/API/HTMLAudioElement) to Kotlin\n */\npublic external abstract class HTMLAudioElement : HTMLMediaElement {\n}\n\n/**\n * Exposes the JavaScript [HTMLTrackElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTrackElement) to Kotlin\n */\npublic external abstract class HTMLTrackElement : HTMLElement {\n   open var kind: String\n   open var src: String\n   open var srclang: String\n   open var label: String\n   open var default: Boolean\n   open val readyState: Short\n   open val track: TextTrack\n\n   companion object {\n   val NONE: Short\n   val LOADING: Short\n   val LOADED: Short\n   val ERROR: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [HTMLMediaElement](https://developer.mozilla.org/en/docs/Web/API/HTMLMediaElement) to Kotlin\n */\npublic external abstract class HTMLMediaElement : HTMLElement {\n   open val error: MediaError?\n   open var src: String\n   open var srcObject: dynamic\n   open val currentSrc: String\n   open var crossOrigin: String?\n   open val networkState: Short\n   open var preload: String\n   open val buffered: TimeRanges\n   open val readyState: Short\n   open val seeking: Boolean\n   open var currentTime: Double\n   open val duration: Double\n   open val paused: Boolean\n   open var defaultPlaybackRate: Double\n   open var playbackRate: Double\n   open val played: TimeRanges\n   open val seekable: TimeRanges\n   open val ended: Boolean\n   open var autoplay: Boolean\n   open var loop: Boolean\n   open var controls: Boolean\n   open var volume: Double\n   open var muted: Boolean\n   open var defaultMuted: Boolean\n   open val audioTracks: AudioTrackList\n   open val videoTracks: VideoTrackList\n   open val textTracks: TextTrackList\n   fun load(): Unit\n   fun canPlayType(type: String): CanPlayTypeResult\n   fun fastSeek(time: Double): Unit\n   fun getStartDate(): dynamic\n   fun play(): Promise<Unit>\n   fun pause(): Unit\n   fun addTextTrack(kind: TextTrackKind, label: String = definedExternally, language: String = definedExternally): TextTrack\n\n   companion object {\n   val NETWORK_EMPTY: Short\n   val NETWORK_IDLE: Short\n   val NETWORK_LOADING: Short\n   val NETWORK_NO_SOURCE: Short\n   val HAVE_NOTHING: Short\n   val HAVE_METADATA: Short\n   val HAVE_CURRENT_DATA: Short\n   val HAVE_FUTURE_DATA: Short\n   val HAVE_ENOUGH_DATA: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [MediaError](https://developer.mozilla.org/en/docs/Web/API/MediaError) to Kotlin\n */\npublic external abstract class MediaError {\n   open val code: Short\n\n   companion object {\n   val MEDIA_ERR_ABORTED: Short\n   val MEDIA_ERR_NETWORK: Short\n   val MEDIA_ERR_DECODE: Short\n   val MEDIA_ERR_SRC_NOT_SUPPORTED: Short\n   }\n}\n\npublic external abstract class AudioTrackList : EventTarget {\n   open val length: Int\n   open var onchange: ((Event) -> dynamic)?\n   open var onaddtrack: ((Event) -> dynamic)?\n   open var onremovetrack: ((Event) -> dynamic)?\n   fun getTrackById(id: String): AudioTrack?\n}\n@kotlin.internal.InlineOnly inline operator fun AudioTrackList.get(index: Int): AudioTrack? = asDynamic()[index]\n\npublic external abstract class AudioTrack : UnionAudioTrackOrTextTrackOrVideoTrack {\n   open val id: String\n   open val kind: String\n   open val label: String\n   open val language: String\n   open var enabled: Boolean\n}\n\npublic external abstract class VideoTrackList : EventTarget {\n   open val length: Int\n   open val selectedIndex: Int\n   open var onchange: ((Event) -> dynamic)?\n   open var onaddtrack: ((Event) -> dynamic)?\n   open var onremovetrack: ((Event) -> dynamic)?\n   fun getTrackById(id: String):

VideoTrack?\n}\n@kotlin.internal.InlineOnly inline operator fun VideoTrackList.get(index: Int): VideoTrack? = asDynamic()[index]\n\npublic external abstract class VideoTrack : UnionAudioTrackOrTextTrackOrVideoTrack {\n   open val id: String\n   open val kind: String\n   open val label: String\n   open val language: String\n   open var selected: Boolean\n}\n\npublic external abstract class TextTrackList : EventTarget {\n   open val length: Int\n   open var onchange: ((Event) -> dynamic)?\n   open var onaddtrack: ((Event) -> dynamic)?\n   open var onremovetrack: ((Event) -> dynamic)?\n   fun getTrackById(id: String): TextTrack?\n}\n@kotlin.internal.InlineOnly inline operator fun TextTrackList.get(index: Int): TextTrack? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [TextTrack](https://developer.mozilla.org/en/docs/Web/API/TextTrack) to Kotlin\n */\npublic external abstract class TextTrack : EventTarget, UnionAudioTrackOrTextTrackOrVideoTrack {\n   open val kind: TextTrackKind\n   open val label: String\n   open val language: String\n   open val id: String\n   open val inBandMetadataTrackDispatchType: String\n   open var mode: TextTrackMode\n   open val cues: TextTrackCueList?\n   open val activeCues: TextTrackCueList?\n   open var oncuechange: ((Event) -> dynamic)?\n   fun addCue(cue: TextTrackCue): Unit\n   fun removeCue(cue: TextTrackCue): Unit\n}\n\npublic external abstract class TextTrackCueList {\n   open val length: Int\n   fun getCueById(id: String): TextTrackCue?\n}\n@kotlin.internal.InlineOnly inline operator fun TextTrackCueList.get(index: Int): TextTrackCue? = asDynamic()[index]\n\npublic external abstract class TextTrackCue : EventTarget {\n   open val track: TextTrack?\n   open var id: String\n   open var startTime: Double\n   open var endTime: Double\n   open var pauseOnExit: Boolean\n   open var onenter: ((Event) -> dynamic)?\n   open var onexit: ((Event) -> dynamic)?\n}\n\n/**\n * Exposes the JavaScript [TimeRanges](https://developer.mozilla.org/en/docs/Web/API/TimeRanges) to Kotlin\n */\npublic external abstract class TimeRanges {\n   open val length: Int\n   fun start(index: Int): Double\n   fun end(index: Int): Double\n}\n\npublic external open class TrackEvent(type: String, eventInitDict: TrackEventInit = definedExternally) : Event {\n   open val track: UnionAudioTrackOrTextTrackOrVideoTrack?\n}\n\npublic external interface TrackEventInit : EventInit {\n   var track: UnionAudioTrackOrTextTrackOrVideoTrack? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun TrackEventInit(track: UnionAudioTrackOrTextTrackOrVideoTrack? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): TrackEventInit {\n   val o = js(\"({})\")\n\n   o[\"track\"] = track\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [HTMLMapElement](https://developer.mozilla.org/en/docs/Web/API/HTMLMapElement) to Kotlin\n */\npublic external abstract class HTMLMapElement : HTMLElement {\n   open var name: String\n   open val areas: HTMLCollection\n}\n\n/**\n * Exposes the JavaScript [HTMLAreaElement](https://developer.mozilla.org/en/docs/Web/API/HTMLAreaElement) to Kotlin\n */\npublic external abstract class HTMLAreaElement : HTMLElement, HTMLHyperlinkElementUtils {\n   open var alt: String\n   open var coords: String\n   open var shape: String\n   open var target: String\n   open var download: String\n   open var ping: String\n   open var rel: String\n   open val relList: DOMTokenList\n   open var referrerPolicy: String\n   open var noHref: Boolean\n}\n\n/**\n * Exposes the JavaScript [HTMLTableElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableElement) to Kotlin\n */\npublic external abstract class HTMLTableElement : HTMLElement {\n   open var caption: HTMLTableCaptionElement?\n   open var tHead: HTMLTableSectionElement?\n   open var tFoot: HTMLTableSectionElement?\n   open val tBodies: HTMLCollection\n   open val rows: HTMLCollection\n   open var align: String\n   open var border: String\n   open var frame: String\n   open var rules: String\n   open var summary: String\n   open var width: String\n   open var bgColor: String\n   open var cellPadding: String\n   open var cellSpacing: String\n   fun createCaption(): HTMLTableCaptionElement\n   fun deleteCaption(): Unit\n   fun createTHead(): HTMLTableSectionElement\n   fun deleteTHead(): Unit\n   fun createTFoot(): HTMLTableSectionElement\n   fun deleteTFoot(): Unit\n   fun createTBody(): HTMLTableSectionElement\n   fun insertRow(index: Int = definedExternally): HTMLTableRowElement\n   fun deleteRow(index: Int):

Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLTableCaptionElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableCaptionElement) to Kotlin\n */\npublic external abstract class HTMLTableCaptionElement : HTMLElement {\n   open var align: String\n}\n\n/**\n * Exposes the JavaScript [HTMLTableColElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableColElement) to Kotlin\n */\npublic external abstract class HTMLTableColElement : HTMLElement {\n   open var span: Int\n   open var align: String\n   open var ch: String\n   open var chOff: String\n   open var vAlign: String\n   open var width: String\n}\n\n/**\n * Exposes the JavaScript [HTMLTableSectionElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableSectionElement) to Kotlin\n */\npublic external abstract class HTMLTableSectionElement : HTMLElement {\n   open val rows: HTMLCollection\n   open var align: String\n   open var ch: String\n   open var chOff: String\n   open var vAlign: String\n   fun insertRow(index: Int = definedExternally): HTMLElement\n   fun deleteRow(index: Int): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLTableRowElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableRowElement) to Kotlin\n */\npublic external abstract class HTMLTableRowElement : HTMLElement {\n   open val rowIndex: Int\n   open val sectionRowIndex: Int\n   open val cells: HTMLCollection\n   open var align: String\n   open var ch: String\n   open var chOff: String\n   open var vAlign: String\n   open var bgColor: String\n   fun insertCell(index: Int = definedExternally): HTMLElement\n   fun deleteCell(index: Int): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLTableCellElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTableCellElement) to Kotlin\n */\npublic external abstract class HTMLTableCellElement : HTMLElement {\n   open var colSpan: Int\n   open var rowSpan: Int\n   open var headers: String\n   open val cellIndex: Int\n   open var scope: String\n   open var abbr: String\n   open var align: String\n   open var axis: String\n   open var height: String\n   open var width: String\n   open var ch: String\n   open var chOff: String\n   open var noWrap: Boolean\n   open var vAlign: String\n   open var bgColor: String\n}\n\n/**\n * Exposes the JavaScript [HTMLFormElement](https://developer.mozilla.org/en/docs/Web/API/HTMLFormElement) to Kotlin\n */\npublic external abstract class HTMLFormElement : HTMLElement {\n   open var acceptCharset: String\n   open var action: String\n   open var autocomplete: String\n   open var enctype: String\n   open var encoding: String\n   open var method: String\n   open var name: String\n   open var noValidate: Boolean\n   open var target: String\n   open val elements: HTMLFormControlsCollection\n   open val length: Int\n   fun submit(): Unit\n   fun reset(): Unit\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n}\n@kotlin.internal.InlineOnly inline operator fun HTMLFormElement.get(index: Int): Element? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun HTMLFormElement.get(name: String): UnionElementOrRadioNodeList? = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [HTMLLabelElement](https://developer.mozilla.org/en/docs/Web/API/HTMLLabelElement) to Kotlin\n */\npublic external abstract class HTMLLabelElement : HTMLElement {\n   open val form: HTMLFormElement?\n   open var htmlFor: String\n   open val control: HTMLElement?\n}\n\n/**\n * Exposes the JavaScript [HTMLInputElement](https://developer.mozilla.org/en/docs/Web/API/HTMLInputElement) to Kotlin\n */\npublic external abstract class HTMLInputElement : HTMLElement {\n   open var accept: String\n   open var alt: String\n   open var autocomplete: String\n   open var autofocus: Boolean\n   open var defaultChecked: Boolean\n   open var checked: Boolean\n   open var dirName: String\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open val files: FileList?\n   open var formAction: String\n   open var formEnctype: String\n   open var formMethod: String\n   open var formNoValidate: Boolean\n   open var formTarget: String\n   open var height: Int\n   open var indeterminate: Boolean\n   open var inputMode: String\n   open val list: HTMLElement?\n   open var max: String\n   open var maxLength: Int\n   open var min: String\n   open var minLength: Int\n   open var multiple: Boolean\n   open var name: String\n   open var pattern: String\n   open var placeholder: String\n   open var readOnly: Boolean\n   open var required: Boolean\n   open var size: Int\n   open var src: String\n   open var step: String\n   open var type: String\n   open var defaultValue: String\n   open var value: String\n   open var valueAsDate: dynamic\n   open var valueAsNumber: Double\n   open var width: Int\n

open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   open var selectionStart: Int?\n   open var selectionEnd: Int?\n   open var selectionDirection: String?\n   open var align: String\n   open var useMap: String\n   fun stepUp(n: Int = definedExternally): Unit\n   fun stepDown(n: Int = definedExternally): Unit\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n   fun select(): Unit\n   fun setRangeText(replacement: String): Unit\n   fun setRangeText(replacement: String, start: Int, end: Int, selectionMode: SelectionMode = definedExternally): Unit\n   fun setSelectionRange(start: Int, end: Int, direction: String = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLButtonElement](https://developer.mozilla.org/en/docs/Web/API/HTMLButtonElement) to Kotlin\n */\npublic external abstract class HTMLButtonElement : HTMLElement {\n   open var autofocus: Boolean\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var formAction: String\n   open var formEnctype: String\n   open var formMethod: String\n   open var formNoValidate: Boolean\n   open var formTarget: String\n   open var name: String\n   open var type: String\n   open var value: String\n   open var menu: HTMLMenuElement?\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLSelectElement](https://developer.mozilla.org/en/docs/Web/API/HTMLSelectElement) to Kotlin\n */\npublic external abstract class HTMLSelectElement : HTMLElement, ItemArrayLike<Element> {\n   open var autocomplete: String\n   open var autofocus: Boolean\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var multiple: Boolean\n   open var name: String\n   open var required: Boolean\n   open var size: Int\n   open val type: String\n   open val options: HTMLOptionsCollection\n   override var length: Int\n   open val selectedOptions: HTMLCollection\n   open var selectedIndex: Int\n   open var value: String\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   override fun item(index: Int): Element?\n   fun namedItem(name: String): HTMLOptionElement?\n   fun add(element: UnionHTMLOptGroupElementOrHTMLOptionElement, before: dynamic = definedExternally): Unit\n   fun remove(index: Int): Unit\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n@kotlin.internal.InlineOnly inline operator fun HTMLSelectElement.get(index: Int): Element? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun HTMLSelectElement.set(index: Int, option: HTMLOptionElement?): Unit { asDynamic()[index] = option; }\n\n/**\n * Exposes the JavaScript [HTMLDataListElement](https://developer.mozilla.org/en/docs/Web/API/HTMLDataListElement) to Kotlin\n */\npublic external abstract class HTMLDataListElement : HTMLElement {\n   open val options: HTMLCollection\n}\n\n/**\n * Exposes the JavaScript [HTMLOptGroupElement](https://developer.mozilla.org/en/docs/Web/API/HTMLOptGroupElement) to Kotlin\n */\npublic external abstract class HTMLOptGroupElement : HTMLElement, UnionHTMLOptGroupElementOrHTMLOptionElement {\n   open var disabled: Boolean\n   open var label: String\n}\n\n/**\n * Exposes the JavaScript [HTMLOptionElement](https://developer.mozilla.org/en/docs/Web/API/HTMLOptionElement) to Kotlin\n */\npublic external abstract class HTMLOptionElement : HTMLElement, UnionHTMLOptGroupElementOrHTMLOptionElement {\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var label: String\n   open var defaultSelected: Boolean\n   open var selected: Boolean\n   open var value: String\n   open var text: String\n   open val index: Int\n}\n\n/**\n * Exposes the JavaScript [HTMLTextAreaElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTextAreaElement) to Kotlin\n */\npublic external abstract class HTMLTextAreaElement : HTMLElement {\n   open var autocomplete: String\n   open var autofocus: Boolean\n   open var cols: Int\n   open var dirName: String\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var inputMode: String\n   open var maxLength: Int\n   open var minLength: Int\n   open var name: String\n   open var placeholder: String\n   open var readOnly: Boolean\n   open var required: Boolean\n   open var rows: Int\n   open var wrap: String\n   open val type: String\n

open var defaultValue: String\n   open var value: String\n   open val textLength: Int\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   open var selectionStart: Int?\n   open var selectionEnd: Int?\n   open var selectionDirection: String?\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n   fun select(): Unit\n   fun setRangeText(replacement: String): Unit\n   fun setRangeText(replacement: String, start: Int, end: Int, selectionMode: SelectionMode = definedExternally): Unit\n   fun setSelectionRange(start: Int, end: Int, direction: String = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLKeygenElement](https://developer.mozilla.org/en/docs/Web/API/HTMLKeygenElement) to Kotlin\n */\npublic external abstract class HTMLKeygenElement : HTMLElement {\n   open var autofocus: Boolean\n   open var challenge: String\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var keytype: String\n   open var name: String\n   open val type: String\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLOutputElement](https://developer.mozilla.org/en/docs/Web/API/HTMLOutputElement) to Kotlin\n */\npublic external abstract class HTMLOutputElement : HTMLElement {\n   open val htmlFor: DOMTokenList\n   open val form: HTMLFormElement?\n   open var name: String\n   open val type: String\n   open var defaultValue: String\n   open var value: String\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   open val labels: NodeList\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLProgressElement](https://developer.mozilla.org/en/docs/Web/API/HTMLProgressElement) to Kotlin\n */\npublic external abstract class HTMLProgressElement : HTMLElement {\n   open var value: Double\n   open var max: Double\n   open val position: Double\n   open val labels: NodeList\n}\n\n/**\n * Exposes the JavaScript [HTMLMeterElement](https://developer.mozilla.org/en/docs/Web/API/HTMLMeterElement) to Kotlin\n */\npublic external abstract class HTMLMeterElement : HTMLElement {\n   open var value: Double\n   open var min: Double\n   open var max: Double\n   open var low: Double\n   open var high: Double\n   open var optimum: Double\n   open val labels: NodeList\n}\n\n/**\n * Exposes the JavaScript [HTMLFieldSetElement](https://developer.mozilla.org/en/docs/Web/API/HTMLFieldSetElement) to Kotlin\n */\npublic external abstract class HTMLFieldSetElement : HTMLElement {\n   open var disabled: Boolean\n   open val form: HTMLFormElement?\n   open var name: String\n   open val type: String\n   open val elements: HTMLCollection\n   open val willValidate: Boolean\n   open val validity: ValidityState\n   open val validationMessage: String\n   fun checkValidity(): Boolean\n   fun reportValidity(): Boolean\n   fun setCustomValidity(error: String): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLLegendElement](https://developer.mozilla.org/en/docs/Web/API/HTMLLegendElement) to Kotlin\n */\npublic external abstract class HTMLLegendElement : HTMLElement {\n   open val form: HTMLFormElement?\n   open var align: String\n}\n\n/**\n * Exposes the JavaScript [ValidityState](https://developer.mozilla.org/en/docs/Web/API/ValidityState) to Kotlin\n */\npublic external abstract class ValidityState {\n   open val valueMissing: Boolean\n   open val typeMismatch: Boolean\n   open val patternMismatch: Boolean\n   open val tooLong: Boolean\n   open val tooShort: Boolean\n   open val rangeUnderflow: Boolean\n   open val rangeOverflow: Boolean\n   open val stepMismatch: Boolean\n   open val badInput: Boolean\n   open val customError: Boolean\n   open val valid: Boolean\n}\n\npublic external abstract class HTMLDetailsElement : HTMLElement {\n   open var open: Boolean\n}\n\npublic external abstract class HTMLMenuElement : HTMLElement {\n   open var type: String\n   open var label: String\n   open var compact: Boolean\n}\n\npublic external abstract class HTMLMenuItemElement : HTMLElement {\n   open var type: String\n   open var label: String\n   open var icon: String\n   open var disabled: Boolean\n   open var checked: Boolean\n   open var radiogroup: String\n   open var default: Boolean\n}\n\npublic external open class RelatedEvent(type: String, eventInitDict: RelatedEventInit = definedExternally) : Event {\n   open val relatedTarget: EventTarget?\n}\n\npublic external interface RelatedEventInit : EventInit {\n   var relatedTarget: EventTarget? /* = null */\n   get() = definedExternally\n   set(value) =

definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun RelatedEventInit(relatedTarget: EventTarget? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): RelatedEventInit {\n   val o = js(\"({})\")\n   o[\"relatedTarget\"] = relatedTarget\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n/**\n * Exposes the JavaScript [HTMLDialogElement](https://developer.mozilla.org/en/docs/Web/API/HTMLDialogElement) to Kotlin\n */\npublic external abstract class HTMLDialogElement : HTMLElement {\n   open var open: Boolean\n   open var returnValue: String\n   fun show(anchor: UnionElementOrMouseEvent = definedExternally): Unit\n   fun showModal(anchor: UnionElementOrMouseEvent = definedExternally): Unit\n   fun close(returnValue: String = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLScriptElement](https://developer.mozilla.org/en/docs/Web/API/HTMLScriptElement) to Kotlin\n */\npublic external abstract class HTMLScriptElement : HTMLElement, HTMLOrSVGScriptElement {\n   open var src: String\n   open var type: String\n   open var charset: String\n   open var async: Boolean\n   open var defer: Boolean\n   open var crossOrigin: String?\n   open var text: String\n   open var nonce: String\n   open var event: String\n   open var htmlFor: String\n}\n\n/**\n * Exposes the JavaScript [HTMLTemplateElement](https://developer.mozilla.org/en/docs/Web/API/HTMLTemplateElement) to Kotlin\n */\npublic external abstract class HTMLTemplateElement : HTMLElement {\n   open val content: DocumentFragment\n}\n\n/**\n * Exposes the JavaScript [HTMLSlotElement](https://developer.mozilla.org/en/docs/Web/API/HTMLSlotElement) to Kotlin\n */\npublic external abstract class HTMLSlotElement : HTMLElement {\n   open var name: String\n   fun assignedNodes(options: AssignedNodesOptions = definedExternally): Array<Node>\n}\n\npublic external interface AssignedNodesOptions {\n   var flatten: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun AssignedNodesOptions(flatten: Boolean? = false): AssignedNodesOptions {\n   val o = js(\"({})\")\n\n   o[\"flatten\"] = flatten\n\n   return o}\n\n/**\n * Exposes the JavaScript [HTMLCanvasElement](https://developer.mozilla.org/en/docs/Web/API/HTMLCanvasElement) to Kotlin\n */\npublic external abstract class HTMLCanvasElement : HTMLElement, TexImageSource {\n   open var width: Int\n   open var height: Int\n   fun getContext(contextId: String, vararg arguments: Any?): RenderingContext?\n   fun toDataURL(type: String = definedExternally, quality: Any? = definedExternally): String\n   fun toBlob(_callback: (Blob?) -> Unit, type: String = definedExternally, quality: Any? = definedExternally): Unit\n}\n\npublic external interface CanvasRenderingContext2DSettings {\n   var alpha: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CanvasRenderingContext2DSettings(alpha: Boolean? = true): CanvasRenderingContext2DSettings {\n   val o = js(\"({})\")\n\n   o[\"alpha\"] = alpha\n\n   return o}\n\n/**\n * Exposes the JavaScript [CanvasRenderingContext2D](https://developer.mozilla.org/en/docs/Web/API/CanvasRenderingContext2D) to Kotlin\n */\npublic external abstract class CanvasRenderingContext2D : CanvasState, CanvasTransform, CanvasCompositing, CanvasImageSmoothing, CanvasFillStrokeStyles, CanvasShadowStyles, CanvasFilters, CanvasRect, CanvasDrawPath, CanvasUserInterface, CanvasText, CanvasDrawImage, CanvasHitRegion, CanvasImageData, CanvasPathDrawingStyles, CanvasTextDrawingStyles, CanvasPath, RenderingContext {\n   open val canvas: HTMLCanvasElement\n}\n\npublic external interface CanvasState {\n   fun save(): Unit\n   fun restore(): Unit\n}\n\npublic external interface CanvasTransform {\n   fun scale(x: Double, y: Double): Unit\n   fun rotate(angle: Double): Unit\n   fun translate(x: Double, y: Double): Unit\n   fun transform(a: Double, b: Double, c: Double, d: Double, e: Double, f: Double): Unit\n   fun getTransform(): DOMMatrix\n   fun setTransform(a: Double, b: Double, c: Double, d: Double, e: Double, f: Double): Unit\n   fun setTransform(transform: dynamic = definedExternally): Unit\n   fun resetTransform(): Unit\n}\n\npublic external interface CanvasCompositing {\n   var globalAlpha: Double\n   var globalCompositeOperation: String\n}\n\npublic external interface CanvasImageSmoothing {\n   var imageSmoothingEnabled: Boolean\n   var imageSmoothingQuality: ImageSmoothingQuality\n}\n\npublic external interface CanvasFillStrokeStyles {\n   var strokeStyle: dynamic\n   var fillStyle: dynamic\n   fun createLinearGradient(x0: Double, y0: Double, x1: Double, y1: Double):

CanvasGradient\n   fun createRadialGradient(x0: Double, y0: Double, r0: Double, x1: Double, y1: Double, r1: Double): CanvasGradient\n   fun createPattern(image: dynamic, repetition: String): CanvasPattern?\n}\n\npublic external interface CanvasShadowStyles {\n   var shadowOffsetX: Double\n   var shadowOffsetY: Double\n   var shadowBlur: Double\n   var shadowColor: String\n}\n\npublic external interface CanvasFilters {\n   var filter: String\n}\n\npublic external interface CanvasRect {\n   fun clearRect(x: Double, y: Double, w: Double, h: Double): Unit\n   fun fillRect(x: Double, y: Double, w: Double, h: Double): Unit\n   fun strokeRect(x: Double, y: Double, w: Double, h: Double): Unit\n}\n\npublic external interface CanvasDrawPath {\n   fun beginPath(): Unit\n   fun fill(fillRule: CanvasFillRule = definedExternally): Unit\n   fun fill(path: Path2D, fillRule: CanvasFillRule = definedExternally): Unit\n   fun stroke(): Unit\n   fun stroke(path: Path2D): Unit\n   fun clip(fillRule: CanvasFillRule = definedExternally): Unit\n   fun clip(path: Path2D, fillRule: CanvasFillRule = definedExternally): Unit\n   fun resetClip(): Unit\n   fun isPointInPath(x: Double, y: Double, fillRule: CanvasFillRule = definedExternally): Boolean\n   fun isPointInPath(path: Path2D, x: Double, y: Double, fillRule: CanvasFillRule = definedExternally): Boolean\n   fun isPointInStroke(x: Double, y: Double): Boolean\n   fun isPointInStroke(path: Path2D, x: Double, y: Double): Boolean\n}\n\npublic external interface CanvasUserInterface {\n   fun drawFocusIfNeeded(element: Element): Unit\n   fun drawFocusIfNeeded(path: Path2D, element: Element): Unit\n   fun scrollPathIntoView(): Unit\n   fun scrollPathIntoView(path: Path2D): Unit\n}\n\npublic external interface CanvasText {\n   fun fillText(text: String, x: Double, y: Double, maxWidth: Double = definedExternally): Unit\n   fun strokeText(text: String, x: Double, y: Double, maxWidth: Double = definedExternally): Unit\n   fun measureText(text: String): TextMetrics\n}\n\npublic external interface CanvasDrawImage {\n   fun drawImage(image: dynamic, dx: Double, dy: Double): Unit\n   fun drawImage(image: dynamic, dx: Double, dy: Double, dw: Double, dh: Double): Unit\n   fun drawImage(image: dynamic, sx: Double, sy: Double, sw: Double, sh: Double, dx: Double, dy: Double, dw: Double, dh: Double): Unit\n}\n\npublic external interface CanvasHitRegion {\n   fun addHitRegion(options: HitRegionOptions = definedExternally): Unit\n   fun removeHitRegion(id: String): Unit\n   fun clearHitRegions(): Unit\n}\n\npublic external interface CanvasImageData {\n   fun createImageData(sw: Double, sh: Double): ImageData\n   fun createImageData(imagedata: ImageData): ImageData\n   fun getImageData(sx: Double, sy: Double, sw: Double, sh: Double): ImageData\n   fun putImageData(imagedata: ImageData, dx: Double, dy: Double): Unit\n   fun putImageData(imagedata: ImageData, dx: Double, dy: Double, dirtyX: Double, dirtyY: Double, dirtyWidth: Double, dirtyHeight: Double): Unit\n}\n\npublic external interface CanvasPathDrawingStyles {\n   var lineWidth: Double\n   var lineCap: CanvasLineCap\n   var lineJoin: CanvasLineJoin\n   var miterLimit: Double\n   var lineDashOffset: Double\n   fun setLineDash(segments: Array<Double>): Unit\n   fun getLineDash(): Array<Double>\n}\n\npublic external interface CanvasTextDrawingStyles {\n   var font: String\n   var textAlign: CanvasTextAlign\n   var textBaseline: CanvasTextBaseline\n   var direction: CanvasDirection\n}\n\npublic external interface CanvasPath {\n   fun closePath(): Unit\n   fun moveTo(x: Double, y: Double): Unit\n   fun lineTo(x: Double, y: Double): Unit\n   fun quadraticCurveTo(cpx: Double, cpy: Double, x: Double, y: Double): Unit\n   fun bezierCurveTo(cp1x: Double, cp1y: Double, cp2x: Double, cp2y: Double, x: Double, y: Double): Unit\n   fun arcTo(x1: Double, y1: Double, x2: Double, y2: Double, radius: Double): Unit\n   fun arcTo(x1: Double, y1: Double, x2: Double, y2: Double, radiusX: Double, radiusY: Double, rotation: Double): Unit\n   fun rect(x: Double, y: Double, w: Double, h: Double): Unit\n   fun arc(x: Double, y: Double, radius: Double, startAngle: Double, endAngle: Double, anticlockwise: Boolean = definedExternally): Unit\n   fun ellipse(x: Double, y: Double, radiusX: Double, radiusY: Double, rotation: Double, startAngle: Double, endAngle: Double, anticlockwise: Boolean = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [CanvasGradient](https://developer.mozilla.org/en/docs/Web/API/CanvasGradient) to Kotlin\n */\npublic external abstract class CanvasGradient {\n   fun addColorStop(offset: Double, color: String): Unit\n}\n\n/**\n * Exposes the JavaScript [CanvasPattern](https://developer.mozilla.org/en/docs/Web/API/CanvasPattern) to Kotlin\n */\npublic external abstract class CanvasPattern {\n   fun setTransform(transform: dynamic = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [TextMetrics](https://developer.mozilla.org/en/docs/Web/API/TextMetrics) to Kotlin\n */\npublic external abstract

class TextMetrics {\n   open val width: Double\n   open val actualBoundingBoxLeft: Double\n   open val actualBoundingBoxRight: Double\n   open val fontBoundingBoxAscent: Double\n   open val fontBoundingBoxDescent: Double\n   open val actualBoundingBoxAscent: Double\n   open val actualBoundingBoxDescent: Double\n   open val emHeightAscent: Double\n   open val emHeightDescent: Double\n   open val hangingBaseline: Double\n   open val alphabeticBaseline: Double\n   open val ideographicBaseline: Double\n}\n\npublic external interface HitRegionOptions {\n   var path: Path2D? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var fillRule: CanvasFillRule? /* = CanvasFillRule.NONZERO */\n   get() = definedExternally\n   set(value) = definedExternally\n   var id: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var parentID: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var cursor: String? /* = \"inherit\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var control: Element? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var label: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var role: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun HitRegionOptions(path: Path2D? = null, fillRule: CanvasFillRule? = CanvasFillRule.NONZERO, id: String? = \"\", parentID: String? = null, cursor: String? = \"inherit\", control: Element? = null, label: String? = null, role: String? = null): HitRegionOptions {\n   val o = js(\"({})\")\n\n   o[\"path\"] = path\n   o[\"fillRule\"] = fillRule\n   o[\"id\"] = id\n   o[\"parentID\"] = parentID\n   o[\"cursor\"] = cursor\n   o[\"control\"] = control\n   o[\"label\"] = label\n   o[\"role\"] = role\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [ImageData](https://developer.mozilla.org/en/docs/Web/API/ImageData) to Kotlin\n */\npublic external open class ImageData : TexImageSource {\n   constructor(sw: Int, sh: Int)\n   constructor(data: Uint8ClampedArray, sw: Int, sh: Int = definedExternally)\n   open val width: Int\n   open val height: Int\n   open val data: Uint8ClampedArray\n}\n\n/**\n * Exposes the JavaScript [Path2D](https://developer.mozilla.org/en/docs/Web/API/Path2D) to Kotlin\n */\npublic external open class Path2D() : CanvasPath {\n   constructor(path: Path2D)\n   constructor(paths: Array<Path2D>, fillRule: CanvasFillRule = definedExternally)\n   constructor(d: String)\n   fun addPath(path: Path2D, transform: dynamic = definedExternally): Unit\n   override fun closePath(): Unit\n   override fun moveTo(x: Double, y: Double): Unit\n   override fun lineTo(x: Double, y: Double): Unit\n   override fun quadraticCurveTo(cpx: Double, cpy: Double, x: Double, y: Double): Unit\n   override fun bezierCurveTo(cp1x: Double, cp1y: Double, cp2x: Double, cp2y: Double, x: Double, y: Double): Unit\n   override fun arcTo(x1: Double, y1: Double, x2: Double, y2: Double, radius: Double): Unit\n   override fun arcTo(x1: Double, y1: Double, x2: Double, y2: Double, radiusX: Double, radiusY: Double, rotation: Double): Unit\n   override fun rect(x: Double, y: Double, w: Double, h: Double): Unit\n   override fun arc(x: Double, y: Double, radius: Double, startAngle: Double, endAngle: Double, anticlockwise: Boolean /* = definedExternally */): Unit\n   override fun ellipse(x: Double, y: Double, radiusX: Double, radiusY: Double, rotation: Double, startAngle: Double, endAngle: Double, anticlockwise: Boolean /* = definedExternally */): Unit\n}\n\n/**\n * Exposes the JavaScript [Touch](https://developer.mozilla.org/en/docs/Web/API/Touch) to Kotlin\n */\npublic external abstract class Touch {\n   open val region: String?\n}\n\n/**\n * Exposes the JavaScript [ImageBitmapRenderingContext](https://developer.mozilla.org/en/docs/Web/API/ImageBitmapRenderingContext) to Kotlin\n */\npublic external abstract class ImageBitmapRenderingContext {\n   open val canvas: HTMLCanvasElement\n   fun transferFromImageBitmap(bitmap: ImageBitmap?): Unit\n}\n\npublic external interface ImageBitmapRenderingContextSettings {\n   var alpha: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ImageBitmapRenderingContextSettings(alpha: Boolean? = true): ImageBitmapRenderingContextSettings {\n   val o = js(\"({})\")\n\n   o[\"alpha\"] = alpha\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [CustomElementRegistry](https://developer.mozilla.org/en/docs/Web/API/CustomElementRegistry) to Kotlin\n */\npublic external abstract class CustomElementRegistry {\n   fun define(name: String, constructor: () -> dynamic, options: ElementDefinitionOptions = definedExternally): Unit\n   fun get(name: String): Any?\n   fun whenDefined(name: String): Promise<Unit>\n}\n\npublic external interface ElementDefinitionOptions {\n   var

extends: String?\n   get() = definedExternally\n   set(value) =
definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ElementDefinitionOptions(extends: String?
= null): ElementDefinitionOptions {\n   val o = js(\"({})\")\n\n   o[\"extends\"] = extends\n\n   return
o\n}\n\npublic external interface ElementContentEditable {\n   var contentEditable: String\n   val
isContentEditable: Boolean\n}\n\n/**\n * Exposes the JavaScript
[DataTransfer](https://developer.mozilla.org/en/docs/Web/API/DataTransfer) to Kotlin\n */\npublic external
abstract class DataTransfer {\n   open var dropEffect: String\n   open var effectAllowed: String\n   open val items:
DataTransferItemList\n   open val types: Array<out String>\n   open val files: FileList\n   fun
setDragImage(image: Element, x: Int, y: Int): Unit\n   fun getData(format: String): String\n   fun setData(format:
String, data: String): Unit\n   fun clearData(format: String = definedExternally): Unit\n}\n\n/**\n * Exposes the
JavaScript [DataTransferItemList](https://developer.mozilla.org/en/docs/Web/API/DataTransferItemList) to
Kotlin\n */\npublic external abstract class DataTransferItemList {\n   open val length: Int\n   fun add(data: String,
type: String): DataTransferItem?\n   fun add(data: File): DataTransferItem?\n   fun remove(index: Int): Unit\n   fun
clear(): Unit\n}\n@kotlin.internal.InlineOnly inline operator fun DataTransferItemList.get(index: Int):
DataTransferItem? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript
[DataTransferItem](https://developer.mozilla.org/en/docs/Web/API/DataTransferItem) to Kotlin\n */\npublic
external abstract class DataTransferItem {\n   open val kind: String\n   open val type: String\n   fun
getAsString(_callback: ((String) -> Unit)?): Unit\n   fun getAsFile(): File?\n}\n\n/**\n * Exposes the JavaScript
[DragEvent](https://developer.mozilla.org/en/docs/Web/API/DragEvent) to Kotlin\n */\npublic external open class
DragEvent(type: String, eventInitDict: DragEventInit = definedExternally) : MouseEvent {\n   open val
dataTransfer: DataTransfer?\n}\n\npublic external interface DragEventInit : MouseEventInit {\n   var dataTransfer:
DataTransfer? /* = null */\n   get() = definedExternally\n   set(value) =
definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun DragEventInit(dataTransfer: DataTransfer?
= null, screenX: Int? = 0, screenY: Int? = 0, clientX: Int? = 0, clientY: Int? = 0, button: Short? = 0, buttons: Short? =
0, relatedTarget: EventTarget? = null, ctrlKey: Boolean? = false, shiftKey: Boolean? = false, altKey: Boolean? =
false, metaKey: Boolean? = false, modifierAltGraph: Boolean? = false, modifierCapsLock: Boolean? = false,
modifierFn: Boolean? = false, modifierFnLock: Boolean? = false, modifierHyper: Boolean? = false,
modifierNumLock: Boolean? = false, modifierScrollLock: Boolean? = false, modifierSuper: Boolean? = false,
modifierSymbol: Boolean? = false, modifierSymbolLock: Boolean? = false, view: Window? = null, detail: Int? = 0,
bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): DragEventInit {\n   val o =
js(\"({})\")\n\n   o[\"dataTransfer\"] = dataTransfer\n   o[\"screenX\"] = screenX\n   o[\"screenY\"] = screenY\n
o[\"clientX\"] = clientX\n   o[\"clientY\"] = clientY\n   o[\"button\"] = button\n   o[\"buttons\"] = buttons\n
o[\"relatedTarget\"] = relatedTarget\n   o[\"ctrlKey\"] = ctrlKey\n   o[\"shiftKey\"] = shiftKey\n   o[\"altKey\"] =
altKey\n   o[\"metaKey\"] = metaKey\n   o[\"modifierAltGraph\"] = modifierAltGraph\n
o[\"modifierCapsLock\"] = modifierCapsLock\n   o[\"modifierFn\"] = modifierFn\n   o[\"modifierFnLock\"] =
modifierFnLock\n   o[\"modifierHyper\"] = modifierHyper\n   o[\"modifierNumLock\"] = modifierNumLock\n
o[\"modifierScrollLock\"] = modifierScrollLock\n   o[\"modifierSuper\"] = modifierSuper\n
o[\"modifierSymbol\"] = modifierSymbol\n   o[\"modifierSymbolLock\"] = modifierSymbolLock\n   o[\"view\"] =
view\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] =
composed\n\n   return o\n}\n\npublic external abstract class BarProp {\n   open val visible: Boolean\n}\n\n/**\n *
Exposes the JavaScript [History](https://developer.mozilla.org/en/docs/Web/API/History) to Kotlin\n */\npublic
external abstract class History {\n   open val length: Int\n   open var scrollRestoration: ScrollRestoration\n   open
val state: Any?\n   fun go(delta: Int = definedExternally): Unit\n   fun back(): Unit\n   fun forward(): Unit\n   fun
pushState(data: Any?, title: String, url: String? = definedExternally): Unit\n   fun replaceState(data: Any?, title:
String, url: String? = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript
[Location](https://developer.mozilla.org/en/docs/Web/API/Location) to Kotlin\n */\npublic external abstract class
Location {\n   open var href: String\n   open val origin: String\n   open var protocol: String\n   open var host:
String\n   open var hostname: String\n   open var port: String\n   open var pathname: String\n   open var search:

String\n   open var hash: String\n   open val ancestorOrigins: Array<out String>\n   fun assign(url: String): Unit\n   fun replace(url: String): Unit\n   fun reload(): Unit\n}\n\n/**\n * Exposes the JavaScript [PopStateEvent](https://developer.mozilla.org/en/docs/Web/API/PopStateEvent) to Kotlin\n */\npublic external open class PopStateEvent(type: String, eventInitDict: PopStateEventInit = definedExternally) : Event {\n   open val state: Any?\n}\n\npublic external interface PopStateEventInit : EventInit {\n   var state: Any? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun PopStateEventInit(state: Any? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): PopStateEventInit {\n   val o = js(\"({})\")\n\n   o[\"state\"] = state\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n/**\n * Exposes the JavaScript [HashChangeEvent](https://developer.mozilla.org/en/docs/Web/API/HashChangeEvent) to Kotlin\n */\npublic external open class HashChangeEvent(type: String, eventInitDict: HashChangeEventInit = definedExternally) : Event {\n   open val oldURL: String\n   open val newURL: String\n}\n\npublic external interface HashChangeEventInit : EventInit {\n   var oldURL: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var newURL: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun HashChangeEventInit(oldURL: String? = \"\", newURL: String? = \"\", bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): HashChangeEventInit {\n   val o = js(\"({})\")\n\n   o[\"oldURL\"] = oldURL\n   o[\"newURL\"] = newURL\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n/**\n * Exposes the JavaScript [PageTransitionEvent](https://developer.mozilla.org/en/docs/Web/API/PageTransitionEvent) to Kotlin\n */\npublic external open class PageTransitionEvent(type: String, eventInitDict: PageTransitionEventInit = definedExternally) : Event {\n   open val persisted: Boolean\n}\n\npublic external interface PageTransitionEventInit : EventInit {\n   var persisted: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun PageTransitionEventInit(persisted: Boolean? = false, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): PageTransitionEventInit {\n   val o = js(\"({})\")\n\n   o[\"persisted\"] = persisted\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n/**\n * Exposes the JavaScript [BeforeUnloadEvent](https://developer.mozilla.org/en/docs/Web/API/BeforeUnloadEvent) to Kotlin\n */\npublic external open class BeforeUnloadEvent : Event {\n   var returnValue: String\n}\n\npublic external abstract class ApplicationCache : EventTarget {\n   open val status: Short\n   open var onchecking: ((Event) -> dynamic)?\n   open var onerror: ((Event) -> dynamic)?\n   open var onnoupdate: ((Event) -> dynamic)?\n   open var ondownloading: ((Event) -> dynamic)?\n   open var onprogress: ((Event) -> dynamic)?\n   open var onupdateready: ((Event) -> dynamic)?\n   open var oncached: ((Event) -> dynamic)?\n   open var onobsolete: ((Event) -> dynamic)?\n   fun update(): Unit\n   fun abort(): Unit\n   fun swapCache(): Unit\n\n   companion object {\n   val UNCACHED: Short\n   val IDLE: Short\n   val CHECKING: Short\n   val DOWNLOADING: Short\n   val UPDATEREADY: Short\n   val OBSOLETE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [NavigatorOnLine](https://developer.mozilla.org/en/docs/Web/API/NavigatorOnLine) to Kotlin\n */\npublic external interface NavigatorOnLine {\n   val onLine: Boolean\n}\n\n/**\n * Exposes the JavaScript [ErrorEvent](https://developer.mozilla.org/en/docs/Web/API/ErrorEvent) to Kotlin\n */\npublic external open class ErrorEvent(type: String, eventInitDict: ErrorEventInit = definedExternally) : Event {\n   open val message: String\n   open val filename: String\n   open val lineno: Int\n   open val colno: Int\n   open val error: Any?\n}\n\npublic external interface ErrorEventInit : EventInit {\n   var message: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var filename: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var lineno: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var colno: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var error: Any? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ErrorEventInit(message: String? = \"\", filename: String? = \"\", lineno: Int? = 0, colno: Int? = 0, error: Any? = null, bubbles: Boolean? = false, cancelable:

Boolean? = false, composed: Boolean? = false): ErrorEventInit {\n   val o = js(\"({})\")\n\n   o[\"message\"] = message\n   o[\"filename\"] = filename\n   o[\"lineno\"] = lineno\n   o[\"colno\"] = colno\n   o[\"error\"] = error\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [PromiseRejectionEvent](https://developer.mozilla.org/en/docs/Web/API/PromiseRejectionEvent) to Kotlin\n */\npublic external open class PromiseRejectionEvent(type: String, eventInitDict: PromiseRejectionEventInit) : Event {\n   open val promise: Promise<Any?>\n   open val reason: Any?\n}\n\npublic external interface PromiseRejectionEventInit : EventInit {\n   var promise: Promise<Any?>?\n   get() = definedExternally\n   set(value) = definedExternally\n   var reason: Any?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun PromiseRejectionEventInit(promise: Promise<Any?>?, reason: Any? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): PromiseRejectionEventInit {\n   val o = js(\"({})\")\n\n   o[\"promise\"] = promise\n   o[\"reason\"] = reason\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [GlobalEventHandlers](https://developer.mozilla.org/en/docs/Web/API/GlobalEventHandlers) to Kotlin\n */\npublic external interface GlobalEventHandlers {\n   var onabort: ((Event) -> dynamic)?\n   var onblur: ((Event) -> dynamic)?\n   var oncancel: ((Event) -> dynamic)?\n   var oncanplay: ((Event) -> dynamic)?\n   var oncanplaythrough: ((Event) -> dynamic)?\n   var onchange: ((Event) -> dynamic)?\n   var onclick: ((Event) -> dynamic)?\n   var onclose: ((Event) -> dynamic)?\n   var oncontextmenu: ((Event) -> dynamic)?\n   var oncuechange: ((Event) -> dynamic)?\n   var ondblclick: ((Event) -> dynamic)?\n   var ondrag: ((Event) -> dynamic)?\n   var ondragend: ((Event) -> dynamic)?\n   var ondragenter: ((Event) -> dynamic)?\n   var ondragexit: ((Event) -> dynamic)?\n   var ondragleave: ((Event) -> dynamic)?\n   var ondragover: ((Event) -> dynamic)?\n   var ondragstart: ((Event) -> dynamic)?\n   var ondrop: ((Event) -> dynamic)?\n   var ondurationchange: ((Event) -> dynamic)?\n   var onemptied: ((Event) -> dynamic)?\n   var onended: ((Event) -> dynamic)?\n   var onerror: ((dynamic, String, Int, Int, Any?) -> dynamic)?\n   var onfocus: ((Event) -> dynamic)?\n   var oninput: ((Event) -> dynamic)?\n   var oninvalid: ((Event) -> dynamic)?\n   var onkeydown: ((Event) -> dynamic)?\n   var onkeypress: ((Event) -> dynamic)?\n   var onkeyup: ((Event) -> dynamic)?\n   var onload: ((Event) -> dynamic)?\n   var onloadeddata: ((Event) -> dynamic)?\n   var onloadedmetadata: ((Event) -> dynamic)?\n   var onloadend: ((Event) -> dynamic)?\n   var onloadstart: ((Event) -> dynamic)?\n   var onmousedown: ((Event) -> dynamic)?\n   var onmouseenter: ((Event) -> dynamic)?\n   var onmouseleave: ((Event) -> dynamic)?\n   var onmousemove: ((Event) -> dynamic)?\n   var onmouseout: ((Event) -> dynamic)?\n   var onmouseover: ((Event) -> dynamic)?\n   var onmouseup: ((Event) -> dynamic)?\n   var onwheel: ((Event) -> dynamic)?\n   var onpause: ((Event) -> dynamic)?\n   var onplay: ((Event) -> dynamic)?\n   var onplaying: ((Event) -> dynamic)?\n   var onprogress: ((Event) -> dynamic)?\n   var onratechange: ((Event) -> dynamic)?\n   var onreset: ((Event) -> dynamic)?\n   var onresize: ((Event) -> dynamic)?\n   var onscroll: ((Event) -> dynamic)?\n   var onseeked: ((Event) -> dynamic)?\n   var onseeking: ((Event) -> dynamic)?\n   var onselect: ((Event) -> dynamic)?\n   var onshow: ((Event) -> dynamic)?\n   var onstalled: ((Event) -> dynamic)?\n   var onsubmit: ((Event) -> dynamic)?\n   var onsuspend: ((Event) -> dynamic)?\n   var ontimeupdate: ((Event) -> dynamic)?\n   var ontoggle: ((Event) -> dynamic)?\n   var onvolumechange: ((Event) -> dynamic)?\n   var onwaiting: ((Event) -> dynamic)?\n}\n\n/**\n * Exposes the JavaScript [WindowEventHandlers](https://developer.mozilla.org/en/docs/Web/API/WindowEventHandlers) to Kotlin\n */\npublic external interface WindowEventHandlers {\n   var onafterprint: ((Event) -> dynamic)?\n   var onbeforeprint: ((Event) -> dynamic)?\n   var onbeforeunload: ((Event) -> String?)?\n   var onhashchange: ((Event) -> dynamic)?\n   var onlanguagechange: ((Event) -> dynamic)?\n   var onmessage: ((Event) -> dynamic)?\n   var onoffline: ((Event) -> dynamic)?\n   var ononline: ((Event) -> dynamic)?\n   var onpagehide: ((Event) -> dynamic)?\n   var onpageshow: ((Event) -> dynamic)?\n   var onpopstate: ((Event) -> dynamic)?\n   var onrejectionhandled: ((Event) -> dynamic)?\n   var onstorage: ((Event) -> dynamic)?\n   var onunhandledrejection: ((Event) -> dynamic)?\n   var onunload: ((Event) -> dynamic)?\n}\n\npublic external interface DocumentAndElementEventHandlers {\n   var oncopy: ((Event) -> dynamic)?\n   var oncut: ((Event) ->

dynamic)?\n   var onpaste: ((Event) -> dynamic)?\n}\n\n/**\n * Exposes the JavaScript [WindowOrWorkerGlobalScope](https://developer.mozilla.org/en/docs/Web/API/WindowOrWorkerGlobalScope) to Kotlin\n */\npublic external interface WindowOrWorkerGlobalScope {\n   val caches: CacheStorage\n   val origin: String\n   fun fetch(input: dynamic, init: RequestInit = definedExternally): Promise<Response>\n   fun btoa(data: String): String\n   fun atob(data: String): String\n   fun setTimeout(handler: dynamic, timeout: Int = definedExternally, vararg arguments: Any?): Int\n   fun clearTimeout(handle: Int = definedExternally): Unit\n   fun setInterval(handler: dynamic, timeout: Int = definedExternally, vararg arguments: Any?): Int\n   fun clearInterval(handle: Int = definedExternally): Unit\n   fun createImageBitmap(image: dynamic, options: ImageBitmapOptions = definedExternally): Promise<ImageBitmap>\n   fun createImageBitmap(image: dynamic, sx: Int, sy: Int, sw: Int, sh: Int, options: ImageBitmapOptions = definedExternally): Promise<ImageBitmap>\n}\n\n/**\n * Exposes the JavaScript [Navigator](https://developer.mozilla.org/en/docs/Web/API/Navigator) to Kotlin\n */\npublic external abstract class Navigator : NavigatorID, NavigatorLanguage, NavigatorOnLine, NavigatorContentUtils, NavigatorCookies, NavigatorPlugins, NavigatorConcurrentHardware {\n   open val serviceWorker: ServiceWorkerContainer\n   fun vibrate(pattern: dynamic): Boolean\n}\n\n/**\n * Exposes the JavaScript [NavigatorID](https://developer.mozilla.org/en/docs/Web/API/NavigatorID) to Kotlin\n */\npublic external interface NavigatorID {\n   val appCodeName: String\n   val appName: String\n   val appVersion: String\n   val platform: String\n   val product: String\n   val productSub: String\n   val userAgent: String\n   val vendor: String\n   val vendorSub: String\n   val oscpu: String\n   fun taintEnabled(): Boolean\n}\n\n/**\n * Exposes the JavaScript [NavigatorLanguage](https://developer.mozilla.org/en/docs/Web/API/NavigatorLanguage) to Kotlin\n */\npublic external interface NavigatorLanguage {\n   val language: String\n   val languages: Array<out String>\n}\n\npublic external interface NavigatorContentUtils {\n   fun registerProtocolHandler(scheme: String, url: String, title: String): Unit\n   fun registerContentHandler(mimeType: String, url: String, title: String): Unit\n   fun isProtocolHandlerRegistered(scheme: String, url: String): String\n   fun isContentHandlerRegistered(mimeType: String, url: String): String\n   fun unregisterProtocolHandler(scheme: String, url: String): Unit\n   fun unregisterContentHandler(mimeType: String, url: String): Unit\n}\n\npublic external interface NavigatorCookies {\n   val cookieEnabled: Boolean\n}\n\n/**\n * Exposes the JavaScript [NavigatorPlugins](https://developer.mozilla.org/en/docs/Web/API/NavigatorPlugins) to Kotlin\n */\npublic external interface NavigatorPlugins {\n   val plugins: PluginArray\n   val mimeTypes: MimeTypeArray\n   fun javaEnabled(): Boolean\n}\n\n/**\n * Exposes the JavaScript [PluginArray](https://developer.mozilla.org/en/docs/Web/API/PluginArray) to Kotlin\n */\npublic external abstract class PluginArray : ItemArrayLike<Plugin> {\n   override val length: Int\n   fun refresh(reload: Boolean = definedExternally): Unit\n   override fun item(index: Int): Plugin?\n   fun namedItem(name: String): Plugin?\n}\n@kotlin.internal.InlineOnly inline operator fun PluginArray.get(index: Int): Plugin? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun PluginArray.get(name: String): Plugin? = asDynamic()[name]\n\npublic external abstract class MimeTypeArray : ItemArrayLike<MimeType> {\n   override val length: Int\n   override fun item(index: Int): MimeType?\n   fun namedItem(name: String): MimeType?\n}\n@kotlin.internal.InlineOnly inline operator fun MimeTypeArray.get(index: Int): MimeType? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun MimeTypeArray.get(name: String): MimeType? = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [Plugin](https://developer.mozilla.org/en/docs/Web/API/Plugin) to Kotlin\n */\npublic external abstract class Plugin : ItemArrayLike<MimeType> {\n   open val name: String\n   open val description: String\n   open val filename: String\n   override val length: Int\n   override fun item(index: Int): MimeType?\n   fun namedItem(name: String): MimeType?\n}\n@kotlin.internal.InlineOnly inline operator fun Plugin.get(index: Int): MimeType? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun Plugin.get(name: String): MimeType? = asDynamic()[name]\n\npublic external abstract class MimeType {\n   open val type: String\n   open val description: String\n   open val suffixes: String\n   open val enabledPlugin: Plugin\n}\n\n/**\n * Exposes the JavaScript [ImageBitmap](https://developer.mozilla.org/en/docs/Web/API/ImageBitmap) to Kotlin\n */\npublic

external abstract class ImageBitmap : TexImageSource {\n   open val width: Int\n   open val height: Int\n   fun close(): Unit\n}\n\npublic external interface ImageBitmapOptions {\n   var imageOrientation: ImageOrientation? /* = ImageOrientation.NONE */\n   get() = definedExternally\n   set(value) = definedExternally\n   var premultiplyAlpha: PremultiplyAlpha? /* = PremultiplyAlpha.DEFAULT */\n   get() = definedExternally\n   set(value) = definedExternally\n   var colorSpaceConversion: ColorSpaceConversion? /* = ColorSpaceConversion.DEFAULT */\n   get() = definedExternally\n   set(value) = definedExternally\n   var resizeWidth: Int?\n   get() = definedExternally\n   set(value) = definedExternally\n   var resizeHeight: Int?\n   get() = definedExternally\n   set(value) = definedExternally\n   var resizeQuality: ResizeQuality? /* = ResizeQuality.LOW */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ImageBitmapOptions(imageOrientation: ImageOrientation? = ImageOrientation.NONE, premultiplyAlpha: PremultiplyAlpha? = PremultiplyAlpha.DEFAULT, colorSpaceConversion: ColorSpaceConversion? = ColorSpaceConversion.DEFAULT, resizeWidth: Int? = null, resizeHeight: Int? = null, resizeQuality: ResizeQuality? = ResizeQuality.LOW): ImageBitmapOptions {\n   val o = js(\"({})\")\n\n   o[\"imageOrientation\"] = imageOrientation\n   o[\"premultiplyAlpha\"] = premultiplyAlpha\n   o[\"colorSpaceConversion\"] = colorSpaceConversion\n   o[\"resizeWidth\"] = resizeWidth\n   o[\"resizeHeight\"] = resizeHeight\n   o[\"resizeQuality\"] = resizeQuality\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [MessageEvent](https://developer.mozilla.org/en/docs/Web/API/MessageEvent) to Kotlin\n */\npublic external open class MessageEvent(type: String, eventInitDict: MessageEventInit = definedExternally) : Event {\n   open val data: Any?\n   open val origin: String\n   open val lastEventId: String\n   open val source: UnionMessagePortOrWindow?\n   open val ports: Array<out MessagePort>\n   fun initMessageEvent(type: String, bubbles: Boolean, cancelable: Boolean, data: Any?, origin: String, lastEventId: String, source: UnionMessagePortOrWindow?, ports: Array<MessagePort>): Unit\n}\n\npublic external interface MessageEventInit : EventInit {\n   var data: Any? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var origin: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var lastEventId: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var source: UnionMessagePortOrWindow? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var ports: Array<MessagePort>? /* = arrayOf() */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun MessageEventInit(data: Any? = null, origin: String? = \"\", lastEventId: String? = \"\", source: UnionMessagePortOrWindow? = null, ports: Array<MessagePort>? = arrayOf(), bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): MessageEventInit {\n   val o = js(\"({})\")\n\n   o[\"data\"] = data\n   o[\"origin\"] = origin\n   o[\"lastEventId\"] = lastEventId\n   o[\"source\"] = source\n   o[\"ports\"] = ports\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [EventSource](https://developer.mozilla.org/en/docs/Web/API/EventSource) to Kotlin\n */\npublic external open class EventSource(url: String, eventSourceInitDict: EventSourceInit = definedExternally) : EventTarget {\n   open val url: String\n   open val withCredentials: Boolean\n   open val readyState: Short\n   var onopen: ((Event) -> dynamic)?\n   var onmessage: ((Event) -> dynamic)?\n   var onerror: ((Event) -> dynamic)?\n   fun close(): Unit\n\n   companion object {\n   val CONNECTING: Short\n   val OPEN: Short\n   val CLOSED: Short\n   }\n}\n\npublic external interface EventSourceInit {\n   var withCredentials: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun EventSourceInit(withCredentials: Boolean? = false): EventSourceInit {\n   val o = js(\"({})\")\n\n   o[\"withCredentials\"] = withCredentials\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [WebSocket](https://developer.mozilla.org/en/docs/Web/API/WebSocket) to Kotlin\n */\npublic external open class WebSocket(url: String, protocols: dynamic = definedExternally) : EventTarget {\n   open val url: String\n   open val readyState: Short\n   open val bufferedAmount: Int\n   var onopen: ((Event) -> dynamic)?\n   var onerror: ((Event) -> dynamic)?\n   var onclose: ((Event) -> dynamic)?\n   open val extensions: String\n   open val protocol:

String\n   var onmessage: ((Event) -> dynamic)?\n   var binaryType: BinaryType\n   fun close(code: Short = definedExternally, reason: String = definedExternally): Unit\n   fun send(data: String): Unit\n   fun send(data: Blob): Unit\n   fun send(data: ArrayBuffer): Unit\n   fun send(data: ArrayBufferView): Unit\n\n   companion object {\n   val CONNECTING: Short\n   val OPEN: Short\n   val CLOSING: Short\n   val CLOSED: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [CloseEvent](https://developer.mozilla.org/en/docs/Web/API/CloseEvent) to Kotlin\n */\npublic external open class CloseEvent(type: String, eventInitDict: CloseEventInit = definedExternally) : Event {\n   open val wasClean: Boolean\n   open val code: Short\n   open val reason: String\n}\n\npublic external interface CloseEventInit : EventInit {\n   var wasClean: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var code: Short? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var reason: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CloseEventInit(wasClean: Boolean? = false, code: Short? = 0, reason: String? = \"\", bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): CloseEventInit {\n   val o = js(\"({})\")\n\n   o[\"wasClean\"] = wasClean\n   o[\"code\"] = code\n   o[\"reason\"] = reason\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [MessageChannel](https://developer.mozilla.org/en/docs/Web/API/MessageChannel) to Kotlin\n */\npublic external open class MessageChannel {\n   open val port1: MessagePort\n   open val port2: MessagePort\n}\n\n/**\n * Exposes the JavaScript [MessagePort](https://developer.mozilla.org/en/docs/Web/API/MessagePort) to Kotlin\n */\npublic external abstract class MessagePort : EventTarget, UnionMessagePortOrWindow, UnionMessagePortOrServiceWorker, UnionClientOrMessagePortOrServiceWorker {\n   open var onmessage: ((Event) -> dynamic)?\n   fun postMessage(message: Any?, transfer: Array<dynamic> = definedExternally): Unit\n   fun start(): Unit\n   fun close(): Unit\n}\n\n/**\n * Exposes the JavaScript [BroadcastChannel](https://developer.mozilla.org/en/docs/Web/API/BroadcastChannel) to Kotlin\n */\npublic external open class BroadcastChannel(name: String) : EventTarget {\n   open val name: String\n   var onmessage: ((Event) -> dynamic)?\n   fun postMessage(message: Any?): Unit\n   fun close(): Unit\n}\n\n/**\n * Exposes the JavaScript [WorkerGlobalScope](https://developer.mozilla.org/en/docs/Web/API/WorkerGlobalScope) to Kotlin\n */\npublic external abstract class WorkerGlobalScope : EventTarget, WindowOrWorkerGlobalScope, GlobalPerformance {\n   open val self: WorkerGlobalScope\n   open val location: WorkerLocation\n   open val navigator: WorkerNavigator\n   open var onerror: ((dynamic, String, Int, Int, Any?) -> dynamic)?\n   open var onlanguagechange: ((Event) -> dynamic)?\n   open var onoffline: ((Event) -> dynamic)?\n   open var ononline: ((Event) -> dynamic)?\n   open var onrejectionhandled: ((Event) -> dynamic)?\n   open var onunhandledrejection: ((Event) -> dynamic)?\n   fun importScripts(vararg urls: String): Unit\n}\n\n/**\n * Exposes the JavaScript [DedicatedWorkerGlobalScope](https://developer.mozilla.org/en/docs/Web/API/DedicatedWorkerGlobalScope) to Kotlin\n */\npublic external abstract class DedicatedWorkerGlobalScope : WorkerGlobalScope {\n   open var onmessage: ((Event) -> dynamic)?\n   fun postMessage(message: Any?, transfer: Array<dynamic> = definedExternally): Unit\n   fun close(): Unit\n}\n\n/**\n * Exposes the JavaScript [SharedWorkerGlobalScope](https://developer.mozilla.org/en/docs/Web/API/SharedWorkerGlobalScope) to Kotlin\n */\npublic external abstract class SharedWorkerGlobalScope : WorkerGlobalScope {\n   open val name: String\n   open val applicationCache: ApplicationCache\n   open var onconnect: ((Event) -> dynamic)?\n   fun close(): Unit\n}\n\n/**\n * Exposes the JavaScript [AbstractWorker](https://developer.mozilla.org/en/docs/Web/API/AbstractWorker) to Kotlin\n */\npublic external interface AbstractWorker {\n   var onerror: ((Event) -> dynamic)?\n}\n\n/**\n * Exposes the JavaScript [Worker](https://developer.mozilla.org/en/docs/Web/API/Worker) to Kotlin\n */\npublic external open class Worker(scriptURL: String, options: WorkerOptions = definedExternally) : EventTarget, AbstractWorker {\n   var onmessage: ((Event) -> dynamic)?\n   override var onerror: ((Event) -> dynamic)?\n   fun terminate(): Unit\n   fun postMessage(message: Any?, transfer: Array<dynamic> = definedExternally): Unit\n}\n\npublic external interface WorkerOptions {\n   var type: WorkerType? /* = WorkerType.CLASSIC */\n   get() = definedExternally\n

set(value) = definedExternally\n   var credentials: RequestCredentials? /* = RequestCredentials.OMIT */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun WorkerOptions(type: WorkerType? = WorkerType.CLASSIC, credentials: RequestCredentials? = RequestCredentials.OMIT): WorkerOptions {\n   val o = js(\"({})\")\n\n   o[\"type\"] = type\n   o[\"credentials\"] = credentials\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [SharedWorker](https://developer.mozilla.org/en/docs/Web/API/SharedWorker) to Kotlin\n */\npublic external open class SharedWorker(scriptURL: String, name: String = definedExternally, options: WorkerOptions = definedExternally) : EventTarget, AbstractWorker {\n   open val port: MessagePort\n   override var onerror: ((Event) -> dynamic)?\n}\n\n/**\n * Exposes the JavaScript [NavigatorConcurrentHardware](https://developer.mozilla.org/en/docs/Web/API/NavigatorConcurrentHardware) to Kotlin\n */\npublic external interface NavigatorConcurrentHardware {\n   val hardwareConcurrency: Int\n}\n\n/**\n * Exposes the JavaScript [WorkerNavigator](https://developer.mozilla.org/en/docs/Web/API/WorkerNavigator) to Kotlin\n */\npublic external abstract class WorkerNavigator : NavigatorID, NavigatorLanguage, NavigatorOnLine, NavigatorConcurrentHardware {\n   open val serviceWorker: ServiceWorkerContainer\n}\n\n/**\n * Exposes the JavaScript [WorkerLocation](https://developer.mozilla.org/en/docs/Web/API/WorkerLocation) to Kotlin\n */\npublic external abstract class WorkerLocation {\n   open var href: String\n   open val origin: String\n   open val protocol: String\n   open val host: String\n   open val hostname: String\n   open val port: String\n   open val pathname: String\n   open val search: String\n   open val hash: String\n}\n\n/**\n * Exposes the JavaScript [Storage](https://developer.mozilla.org/en/docs/Web/API/Storage) to Kotlin\n */\npublic external abstract class Storage {\n   open val length: Int\n   fun key(index: Int): String?\n   fun getItem(key: String): String?\n   fun setItem(key: String, value: String): Unit\n   fun removeItem(key: String): Unit\n   fun clear(): Unit\n}\n@kotlin.internal.InlineOnly inline operator fun Storage.get(key: String): String? = asDynamic()[key]\n@kotlin.internal.InlineOnly inline operator fun Storage.set(key: String, value: String): Unit { asDynamic()[key] = value; }\n\n/**\n * Exposes the JavaScript [WindowSessionStorage](https://developer.mozilla.org/en/docs/Web/API/WindowSessionStorage) to Kotlin\n */\npublic external interface WindowSessionStorage {\n   val sessionStorage: Storage\n}\n\n/**\n * Exposes the JavaScript [WindowLocalStorage](https://developer.mozilla.org/en/docs/Web/API/WindowLocalStorage) to Kotlin\n */\npublic external interface WindowLocalStorage {\n   val localStorage: Storage\n}\n\n/**\n * Exposes the JavaScript [StorageEvent](https://developer.mozilla.org/en/docs/Web/API/StorageEvent) to Kotlin\n */\npublic external open class StorageEvent(type: String, eventInitDict: StorageEventInit = definedExternally) : Event {\n   open val key: String?\n   open val oldValue: String?\n   open val newValue: String?\n   open val url: String\n   open val storageArea: Storage?\n}\n\npublic external interface StorageEventInit : EventInit {\n   var key: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var oldValue: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var newValue: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var url: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var storageArea: Storage? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun StorageEventInit(key: String? = null, oldValue: String? = null, newValue: String? = null, url: String? = \"\", storageArea: Storage? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): StorageEventInit {\n   val o = js(\"({})\")\n\n   o[\"key\"] = key\n   o[\"oldValue\"] = oldValue\n   o[\"newValue\"] = newValue\n   o[\"url\"] = url\n   o[\"storageArea\"] = storageArea\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\npublic external abstract class HTMLAppletElement : HTMLElement {\n   open var align: String\n   open var alt: String\n   open var archive: String\n   open var code: String\n   open var codeBase: String\n   open var height: String\n   open var hspace: Int\n   open var name: String\n   open var _object: String\n   open var vspace: Int\n   open var width: String\n}\n\npublic external abstract class HTMLMarqueeElement : HTMLElement {\n   open var behavior: String\n   open var bgColor: String\n   open var direction: String\n   open var height: String\n   open var hspace: Int\n   open var loop:

Int\n   open var scrollAmount: Int\n   open var scrollDelay: Int\n   open var trueSpeed: Boolean\n   open var vspace: Int\n   open var width: String\n   open var onbounce: ((Event) -> dynamic)?\n   open var onfinish: ((Event) -> dynamic)?\n   open var onstart: ((Event) -> dynamic)?\n   fun start(): Unit\n   fun stop(): Unit\n}\n\n/**\n * Exposes the JavaScript [HTMLFrameSetElement](https://developer.mozilla.org/en/docs/Web/API/HTMLFrameSetElement) to Kotlin\n */\npublic external abstract class HTMLFrameSetElement : HTMLElement, WindowEventHandlers {\n   open var cols: String\n   open var rows: String\n}\n\npublic external abstract class HTMLFrameElement : HTMLElement {\n   open var name: String\n   open var scrolling: String\n   open var src: String\n   open var frameBorder: String\n   open var longDesc: String\n   open var noResize: Boolean\n   open val contentDocument: Document?\n   open val contentWindow: Window?\n   open var marginHeight: String\n   open var marginWidth: String\n}\n\npublic external abstract class HTMLDirectoryElement : HTMLElement {\n   open var compact: Boolean\n}\n\n/**\n * Exposes the JavaScript [HTMLFontElement](https://developer.mozilla.org/en/docs/Web/API/HTMLFontElement) to Kotlin\n */\npublic external abstract class HTMLFontElement : HTMLElement {\n   open var color: String\n   open var face: String\n   open var size: String\n}\n\npublic external interface External {\n   fun AddSearchProvider(): Unit\n   fun IsSearchProviderInstalled(): Unit\n}\n\npublic external interface EventInit {\n   var bubbles: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var cancelable: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var composed: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun EventInit(bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): EventInit {\n   val o = js(\"({})\")\n\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [CustomEvent](https://developer.mozilla.org/en/docs/Web/API/CustomEvent) to Kotlin\n */\npublic external open class CustomEvent(type: String, eventInitDict: CustomEventInit = definedExternally) : Event {\n   open val detail: Any?\n   fun initCustomEvent(type: String, bubbles: Boolean, cancelable: Boolean, detail: Any?): Unit\n}\n\npublic external interface CustomEventInit : EventInit {\n   var detail: Any? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CustomEventInit(detail: Any? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): CustomEventInit {\n   val o = js(\"({})\")\n\n   o[\"detail\"] = detail\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\npublic external interface EventListenerOptions {\n   var capture: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun EventListenerOptions(capture: Boolean? = false): EventListenerOptions {\n   val o = js(\"({})\")\n\n   o[\"capture\"] = capture\n\n   return o\n}\n\npublic external interface AddEventListenerOptions : EventListenerOptions {\n   var passive: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var once: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun AddEventListenerOptions(passive: Boolean? = false, once: Boolean? = false, capture: Boolean? = false): AddEventListenerOptions {\n   val o = js(\"({})\")\n\n   o[\"passive\"] = passive\n   o[\"once\"] = once\n   o[\"capture\"] = capture\n\n   return o\n}\n\npublic external interface NonElementParentNode {\n   fun getElementById(elementId: String): Element?\n}\n\n/**\n * Exposes the JavaScript [DocumentOrShadowRoot](https://developer.mozilla.org/en/docs/Web/API/DocumentOrShadowRoot) to Kotlin\n */\npublic external interface DocumentOrShadowRoot {\n   val fullscreenElement: Element?\n}\n\n/**\n * Exposes the JavaScript [ParentNode](https://developer.mozilla.org/en/docs/Web/API/ParentNode) to Kotlin\n */\npublic external interface ParentNode {\n   val children: HTMLCollection\n   val firstElementChild: Element?\n   val lastElementChild: Element?\n   val childElementCount: Int\n   fun prepend(vararg nodes: dynamic): Unit\n   fun append(vararg nodes: dynamic): Unit\n   fun querySelector(selectors: String): Element?\n   fun querySelectorAll(selectors: String): NodeList\n}\n\n/**\n * Exposes the JavaScript [NonDocumentTypeChildNode](https://developer.mozilla.org/en/docs/Web/API/NonDocumentTypeChildNode) to Kotlin\n */\npublic external interface NonDocumentTypeChildNode {\n   val previousElementSibling: Element?\n

val nextElementSibling: Element?\n}\n\n/**\n * Exposes the JavaScript [ChildNode](https://developer.mozilla.org/en/docs/Web/API/ChildNode) to Kotlin\n */\npublic external interface ChildNode {\n   fun before(vararg nodes: dynamic): Unit\n   fun after(vararg nodes: dynamic): Unit\n   fun replaceWith(vararg nodes: dynamic): Unit\n   fun remove(): Unit\n}\n\npublic external interface Slotable {\n   val assignedSlot: HTMLSlotElement?\n}\n\n/**\n * Exposes the JavaScript [NodeList](https://developer.mozilla.org/en/docs/Web/API/NodeList) to Kotlin\n */\npublic external abstract class NodeList : ItemArrayLike<Node> {\n   override val length: Int\n   override fun item(index: Int): Node?\n}\n@kotlin.internal.InlineOnly inline operator fun NodeList.get(index: Int): Node? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [HTMLCollection](https://developer.mozilla.org/en/docs/Web/API/HTMLCollection) to Kotlin\n */\npublic external abstract class HTMLCollection : UnionElementOrHTMLCollection, ItemArrayLike<Element> {\n   override val length: Int\n   override fun item(index: Int): Element?\n   fun namedItem(name: String): Element?\n}\n@kotlin.internal.InlineOnly inline operator fun HTMLCollection.get(index: Int): Element? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun HTMLCollection.get(name: String): Element? = asDynamic()[name]\n\n/**\n * Exposes the JavaScript [MutationObserver](https://developer.mozilla.org/en/docs/Web/API/MutationObserver) to Kotlin\n */\npublic external open class MutationObserver(callback: (Array<MutationRecord>, MutationObserver) -> Unit) {\n   fun observe(target: Node, options: MutationObserverInit = definedExternally): Unit\n   fun disconnect(): Unit\n   fun takeRecords(): Array<MutationRecord>\n}\n\npublic external interface MutationObserverInit {\n   var childList: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var attributes: Boolean?\n   get() = definedExternally\n   set(value) = definedExternally\n   var characterData: Boolean?\n   get() = definedExternally\n   set(value) = definedExternally\n   var subtree: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var attributeOldValue: Boolean?\n   get() = definedExternally\n   set(value) = definedExternally\n   var characterDataOldValue: Boolean?\n   get() = definedExternally\n   set(value) = definedExternally\n   var attributeFilter: Array<String>?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun MutationObserverInit(childList: Boolean? = false, attributes: Boolean? = null, characterData: Boolean? = null, subtree: Boolean? = false, attributeOldValue: Boolean? = null, characterDataOldValue: Boolean? = null, attributeFilter: Array<String>? = null): MutationObserverInit {\n   val o = js("({})")\n\n   o[\"childList\"] = childList\n   o[\"attributes\"] = attributes\n   o[\"characterData\"] = characterData\n   o[\"subtree\"] = subtree\n   o[\"attributeOldValue\"] = attributeOldValue\n   o[\"characterDataOldValue\"] = characterDataOldValue\n   o[\"attributeFilter\"] = attributeFilter\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [MutationRecord](https://developer.mozilla.org/en/docs/Web/API/MutationRecord) to Kotlin\n */\npublic external abstract class MutationRecord {\n   open val type: String\n   open val target: Node\n   open val addedNodes: NodeList\n   open val removedNodes: NodeList\n   open val previousSibling: Node?\n   open val nextSibling: Node?\n   open val attributeName: String?\n   open val attributeNamespace: String?\n   open val oldValue: String?\n}\n\n/**\n * Exposes the JavaScript [Node](https://developer.mozilla.org/en/docs/Web/API/Node) to Kotlin\n */\npublic external abstract class Node : EventTarget {\n   open val nodeType: Short\n   open val nodeName: String\n   open val baseURI: String\n   open val isConnected: Boolean\n   open val ownerDocument: Document?\n   open val parentNode: Node?\n   open val parentElement: Element?\n   open val childNodes: NodeList\n   open val firstChild: Node?\n   open val lastChild: Node?\n   open val previousSibling: Node?\n   open val nextSibling: Node?\n   open var nodeValue: String?\n   open var textContent: String?\n   fun getRootNode(options: GetRootNodeOptions = definedExternally): Node\n   fun hasChildNodes(): Boolean\n   fun normalize(): Unit\n   fun cloneNode(deep: Boolean = definedExternally): Node\n   fun isEqualNode(otherNode: Node?): Boolean\n   fun isSameNode(otherNode: Node?): Boolean\n   fun compareDocumentPosition(other: Node): Short\n   fun contains(other: Node?): Boolean\n   fun lookupPrefix(namespace: String?): String?\n   fun lookupNamespaceURI(prefix: String?): String?\n   fun isDefaultNamespace(namespace: String?): Boolean\n   fun insertBefore(node: Node, child: Node?): Node\n   fun appendChild(node: Node): Node\n   fun replaceChild(node:

Node, child: Node): Node\n   fun removeChild(child: Node): Node\n\n   companion object {\n   val ELEMENT_NODE: Short\n   val ATTRIBUTE_NODE: Short\n   val TEXT_NODE: Short\n   val CDATA_SECTION_NODE: Short\n   val ENTITY_REFERENCE_NODE: Short\n   val ENTITY_NODE: Short\n   val PROCESSING_INSTRUCTION_NODE: Short\n   val COMMENT_NODE: Short\n   val DOCUMENT_NODE: Short\n   val DOCUMENT_TYPE_NODE: Short\n   val DOCUMENT_FRAGMENT_NODE: Short\n   val NOTATION_NODE: Short\n   val DOCUMENT_POSITION_DISCONNECTED: Short\n   val DOCUMENT_POSITION_PRECEDING: Short\n   val DOCUMENT_POSITION_FOLLOWING: Short\n   val DOCUMENT_POSITION_CONTAINS: Short\n   val DOCUMENT_POSITION_CONTAINED_BY: Short\n   val DOCUMENT_POSITION_IMPLEMENTATION_SPECIFIC: Short\n   }\n}\n\npublic external interface GetRootNodeOptions {\n   var composed: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun GetRootNodeOptions(composed: Boolean? = false): GetRootNodeOptions {\n   val o = js(\"({})\")\n\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [XMLDocument](https://developer.mozilla.org/en/docs/Web/API/XMLDocument) to Kotlin\n */\npublic external open class XMLDocument : Document {\n   override fun getElementById(elementId: String): Element?\n   override fun prepend(vararg nodes: dynamic): Unit\n   override fun append(vararg nodes: dynamic): Unit\n   override fun querySelector(selectors: String): Element?\n   override fun querySelectorAll(selectors: String): NodeList\n   override fun getBoxQuads(options: BoxQuadOptions /* = definedExternally */): Array<DOMQuad>\n   override fun convertQuadFromNode(quad: dynamic, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertRectFromNode(rect: DOMRectReadOnly, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertPointFromNode(point: DOMPointInit, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMPoint\n}\n\npublic external interface ElementCreationOptions {\n   @JsName(\"is\") var is_: String?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ElementCreationOptions(is_: String? = null): ElementCreationOptions {\n   val o = js(\"({})\")\n\n   o[\"is\"] = is_\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [DOMImplementation](https://developer.mozilla.org/en/docs/Web/API/DOMImplementation) to Kotlin\n */\npublic external abstract class DOMImplementation {\n   fun createDocumentType(qualifiedName: String, publicId: String, systemId: String): DocumentType\n   fun createDocument(namespace: String?, qualifiedName: String, doctype: DocumentType? = definedExternally): XMLDocument\n   fun createHTMLDocument(title: String = definedExternally): Document\n   fun hasFeature(): Boolean\n}\n\n/**\n * Exposes the JavaScript [DocumentType](https://developer.mozilla.org/en/docs/Web/API/DocumentType) to Kotlin\n */\npublic external abstract class DocumentType : Node, ChildNode {\n   open val name: String\n   open val publicId: String\n   open val systemId: String\n}\n\n/**\n * Exposes the JavaScript [DocumentFragment](https://developer.mozilla.org/en/docs/Web/API/DocumentFragment) to Kotlin\n */\npublic external open class DocumentFragment : Node, NonElementParentNode, ParentNode {\n   override val children: HTMLCollection\n   override val firstElementChild: Element?\n   override val lastElementChild: Element?\n   override val childElementCount: Int\n   override fun getElementById(elementId: String): Element?\n   override fun prepend(vararg nodes: dynamic): Unit\n   override fun append(vararg nodes: dynamic): Unit\n   override fun querySelector(selectors: String): Element?\n   override fun querySelectorAll(selectors: String): NodeList\n}\n\n/**\n * Exposes the JavaScript [ShadowRoot](https://developer.mozilla.org/en/docs/Web/API/ShadowRoot) to Kotlin\n */\npublic external open class ShadowRoot : DocumentFragment, DocumentOrShadowRoot {\n   open val mode: ShadowRootMode\n   open val host: Element\n   override val fullscreenElement: Element?\n   override fun getElementById(elementId: String): Element?\n   override fun prepend(vararg nodes: dynamic): Unit\n   override fun append(vararg nodes: dynamic): Unit\n   override fun querySelector(selectors: String): Element?\n   override fun querySelectorAll(selectors: String): NodeList\n}\n\n/**\n * Exposes the JavaScript

[Element](https://developer.mozilla.org/en/docs/Web/API/Element) to Kotlin\n */\npublic external abstract class Element : Node, ParentNode, NonDocumentTypeChildNode, ChildNode, Slotable, GeometryUtils, UnionElementOrProcessingInstruction, UnionElementOrHTMLCollection, UnionElementOrRadioNodeList, UnionElementOrMouseEvent {\n   open var innerHTML: String\n   open var outerHTML: String\n   open val namespaceURI: String?\n   open val prefix: String?\n   open val localName: String\n   open val tagName: String\n   open var id: String\n   open var className: String\n   open val classList: DOMTokenList\n   open var slot: String\n   open val attributes: NamedNodeMap\n   open val shadowRoot: ShadowRoot?\n   open var scrollTop: Double\n   open var scrollLeft: Double\n   open val scrollWidth: Int\n   open val scrollHeight: Int\n   open val clientTop: Int\n   open val clientLeft: Int\n   open val clientWidth: Int\n   open val clientHeight: Int\n   fun requestFullscreen(): Promise<Unit>\n   fun insertAdjacentHTML(position: String, text: String): Unit\n   fun hasAttributes(): Boolean\n   fun getAttributeNames(): Array<String>\n   fun getAttribute(qualifiedName: String): String?\n   fun getAttributeNS(namespace: String?, localName: String): String?\n   fun setAttribute(qualifiedName: String, value: String): Unit\n   fun setAttributeNS(namespace: String?, qualifiedName: String, value: String): Unit\n   fun removeAttribute(qualifiedName: String): Unit\n   fun removeAttributeNS(namespace: String?, localName: String): Unit\n   fun hasAttribute(qualifiedName: String): Boolean\n   fun hasAttributeNS(namespace: String?, localName: String): Boolean\n   fun getAttributeNode(qualifiedName: String): Attr?\n   fun getAttributeNodeNS(namespace: String?, localName: String): Attr?\n   fun setAttributeNode(attr: Attr): Attr?\n   fun setAttributeNodeNS(attr: Attr): Attr?\n   fun removeAttributeNode(attr: Attr): Attr\n   fun attachShadow(init: ShadowRootInit): ShadowRoot\n   fun closest(selectors: String): Element?\n   fun matches(selectors: String): Boolean\n   fun webkitMatchesSelector(selectors: String): Boolean\n   fun getElementsByTagName(qualifiedName: String): HTMLCollection\n   fun getElementsByTagNameNS(namespace: String?, localName: String): HTMLCollection\n   fun getElementsByClassName(classNames: String): HTMLCollection\n   fun insertAdjacentElement(where: String, element: Element): Element?\n   fun insertAdjacentText(where: String, data: String): Unit\n   fun getClientRects(): Array<DOMRect>\n   fun getBoundingClientRect(): DOMRect\n   fun scrollIntoView(): Unit\n   fun scrollIntoView(arg: dynamic): Unit\n   fun scroll(options: ScrollToOptions = definedExternally): Unit\n   fun scroll(x: Double, y: Double): Unit\n   fun scrollTo(options: ScrollToOptions = definedExternally): Unit\n   fun scrollTo(x: Double, y: Double): Unit\n   fun scrollBy(options: ScrollToOptions = definedExternally): Unit\n   fun scrollBy(x: Double, y: Double): Unit\n}\n\npublic external interface ShadowRootInit {\n   var mode: ShadowRootMode?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ShadowRootInit(mode: ShadowRootMode?): ShadowRootInit {\n   val o = js(\"({})\")\n\n   o[\"mode\"] = mode\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [NamedNodeMap](https://developer.mozilla.org/en/docs/Web/API/NamedNodeMap) to Kotlin\n */\npublic external abstract class NamedNodeMap : ItemArrayLike<Attr> {\n   override val length: Int\n   override fun item(index: Int): Attr?\n   fun getNamedItem(qualifiedName: String): Attr?\n   fun getNamedItemNS(namespace: String?, localName: String): Attr?\n   fun setNamedItem(attr: Attr): Attr?\n   fun setNamedItemNS(attr: Attr): Attr?\n   fun removeNamedItem(qualifiedName: String): Attr\n   fun removeNamedItemNS(namespace: String?, localName: String): Attr\n}\n@kotlin.internal.InlineOnly inline operator fun NamedNodeMap.get(index: Int): Attr? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun NamedNodeMap.get(qualifiedName: String): Attr? = asDynamic()[qualifiedName]\n\n/**\n * Exposes the JavaScript [Attr](https://developer.mozilla.org/en/docs/Web/API/Attr) to Kotlin\n */\npublic external abstract class Attr : Node {\n   open val namespaceURI: String?\n   open val prefix: String?\n   open val localName: String\n   open val name: String\n   open var value: String\n   open val ownerElement: Element?\n   open val specified: Boolean\n}\n\n/**\n * Exposes the JavaScript [CharacterData](https://developer.mozilla.org/en/docs/Web/API/CharacterData) to Kotlin\n */\npublic external abstract class CharacterData : Node, NonDocumentTypeChildNode, ChildNode {\n   open var data: String\n   open val length: Int\n   fun substringData(offset: Int, count: Int): String\n   fun appendData(data: String): Unit\n   fun insertData(offset: Int, data: String): Unit\n   fun deleteData(offset: Int, count: Int): Unit\n   fun replaceData(offset:

Int, count: Int, data: String): Unit\n}\n\n/**\n * Exposes the JavaScript [Text](https://developer.mozilla.org/en/docs/Web/API/Text) to Kotlin\n */\npublic external open class Text(data: String = definedExternally) : CharacterData, Slotable, GeometryUtils {\n   open val wholeText: String\n   override val previousElementSibling: Element?\n   override val nextElementSibling: Element?\n   override val assignedSlot: HTMLSlotElement?\n   fun splitText(offset: Int): Text\n   override fun before(vararg nodes: dynamic): Unit\n   override fun after(vararg nodes: dynamic): Unit\n   override fun replaceWith(vararg nodes: dynamic): Unit\n   override fun remove(): Unit\n   override fun getBoxQuads(options: BoxQuadOptions /* = definedExternally */): Array<DOMQuad>\n   override fun convertQuadFromNode(quad: dynamic, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertRectFromNode(rect: DOMRectReadOnly, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertPointFromNode(point: DOMPointInit, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMPoint\n}\n\n/**\n * Exposes the JavaScript [CDATASection](https://developer.mozilla.org/en/docs/Web/API/CDATASection) to Kotlin\n */\npublic external open class CDATASection : Text {\n   override fun before(vararg nodes: dynamic): Unit\n   override fun after(vararg nodes: dynamic): Unit\n   override fun replaceWith(vararg nodes: dynamic): Unit\n   override fun remove(): Unit\n   override fun getBoxQuads(options: BoxQuadOptions /* = definedExternally */): Array<DOMQuad>\n   override fun convertQuadFromNode(quad: dynamic, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertRectFromNode(rect: DOMRectReadOnly, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMQuad\n   override fun convertPointFromNode(point: DOMPointInit, from: dynamic, options: ConvertCoordinateOptions /* = definedExternally */): DOMPoint\n}\n\n/**\n * Exposes the JavaScript [ProcessingInstruction](https://developer.mozilla.org/en/docs/Web/API/ProcessingInstruction) to Kotlin\n */\npublic external abstract class ProcessingInstruction : CharacterData, LinkStyle, UnionElementOrProcessingInstruction {\n   open val target: String\n}\n\n/**\n * Exposes the JavaScript [Comment](https://developer.mozilla.org/en/docs/Web/API/Comment) to Kotlin\n */\npublic external open class Comment(data: String = definedExternally) : CharacterData {\n   override val previousElementSibling: Element?\n   override val nextElementSibling: Element?\n   override fun before(vararg nodes: dynamic): Unit\n   override fun after(vararg nodes: dynamic): Unit\n   override fun replaceWith(vararg nodes: dynamic): Unit\n   override fun remove(): Unit\n}\n\n/**\n * Exposes the JavaScript [Range](https://developer.mozilla.org/en/docs/Web/API/Range) to Kotlin\n */\npublic external open class Range {\n   open val startContainer: Node\n   open val startOffset: Int\n   open val endContainer: Node\n   open val endOffset: Int\n   open val collapsed: Boolean\n   open val commonAncestorContainer: Node\n   fun createContextualFragment(fragment: String): DocumentFragment\n   fun setStart(node: Node, offset: Int): Unit\n   fun setEnd(node: Node, offset: Int): Unit\n   fun setStartBefore(node: Node): Unit\n   fun setStartAfter(node: Node): Unit\n   fun setEndBefore(node: Node): Unit\n   fun setEndAfter(node: Node): Unit\n   fun collapse(toStart: Boolean = definedExternally): Unit\n   fun selectNode(node: Node): Unit\n   fun selectNodeContents(node: Node): Unit\n   fun compareBoundaryPoints(how: Short, sourceRange: Range): Short\n   fun deleteContents(): Unit\n   fun extractContents(): DocumentFragment\n   fun cloneContents(): DocumentFragment\n   fun insertNode(node: Node): Unit\n   fun surroundContents(newParent: Node): Unit\n   fun cloneRange(): Range\n   fun detach(): Unit\n   fun isPointInRange(node: Node, offset: Int): Boolean\n   fun comparePoint(node: Node, offset: Int): Short\n   fun intersectsNode(node: Node): Boolean\n   fun getClientRects(): Array<DOMRect>\n   fun getBoundingClientRect(): DOMRect\n\n   companion object {\n   val START_TO_START: Short\n   val START_TO_END: Short\n   val END_TO_END: Short\n   val END_TO_START: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [NodeIterator](https://developer.mozilla.org/en/docs/Web/API/NodeIterator) to Kotlin\n */\npublic external abstract class NodeIterator {\n   open val root: Node\n   open val referenceNode: Node\n   open val pointerBeforeReferenceNode: Boolean\n   open val whatToShow: Int\n   open val filter: NodeFilter?\n   fun nextNode(): Node?\n   fun previousNode(): Node?\n   fun detach(): Unit\n}\n\n/**\n * Exposes the JavaScript

[TreeWalker](https://developer.mozilla.org/en/docs/Web/API/TreeWalker) to Kotlin\n */\npublic external abstract class TreeWalker {\n   open val root: Node\n   open val whatToShow: Int\n   open val filter: NodeFilter?\n   open var currentNode: Node\n   fun parentNode(): Node?\n   fun firstChild(): Node?\n   fun lastChild(): Node?\n   fun previousSibling(): Node?\n   fun nextSibling(): Node?\n   fun previousNode(): Node?\n   fun nextNode(): Node?\n}\n\n/**\n * Exposes the JavaScript [NodeFilter](https://developer.mozilla.org/en/docs/Web/API/NodeFilter) to Kotlin\n */\npublic external interface NodeFilter {\n   fun acceptNode(node: Node): Short\n\n   companion object {\n   val FILTER_ACCEPT: Short\n   val FILTER_REJECT: Short\n   val FILTER_SKIP: Short\n   val SHOW_ALL: Int\n   val SHOW_ELEMENT: Int\n   val SHOW_ATTRIBUTE: Int\n   val SHOW_TEXT: Int\n   val SHOW_CDATA_SECTION: Int\n   val SHOW_ENTITY_REFERENCE: Int\n   val SHOW_ENTITY: Int\n   val SHOW_PROCESSING_INSTRUCTION: Int\n   val SHOW_COMMENT: Int\n   val SHOW_DOCUMENT: Int\n   val SHOW_DOCUMENT_TYPE: Int\n   val SHOW_DOCUMENT_FRAGMENT: Int\n   val SHOW_NOTATION: Int   }\n}\n\n/**\n * Exposes the JavaScript [DOMTokenList](https://developer.mozilla.org/en/docs/Web/API/DOMTokenList) to Kotlin\n */\npublic external abstract class DOMTokenList : ItemArrayLike<String> {\n   override val length: Int\n   open var value: String\n   override fun item(index: Int): String?\n   fun contains(token: String): Boolean\n   fun add(vararg tokens: String): Unit\n   fun remove(vararg tokens: String): Unit\n   fun toggle(token: String, force: Boolean = definedExternally): Boolean\n   fun replace(token: String, newToken: String): Unit\n   fun supports(token: String): Boolean\n}\n@kotlin.internal.InlineOnly inline operator fun DOMTokenList.get(index: Int): String? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [DOMPointReadOnly](https://developer.mozilla.org/en/docs/Web/API/DOMPointReadOnly) to Kotlin\n */\npublic external open class DOMPointReadOnly(x: Double, y: Double, z: Double, w: Double) {\n   open val x: Double\n   open val y: Double\n   open val z: Double\n   open val w: Double\n   fun matrixTransform(matrix: DOMMatrixReadOnly): DOMPoint\n}\n\n/**\n * Exposes the JavaScript [DOMPoint](https://developer.mozilla.org/en/docs/Web/API/DOMPoint) to Kotlin\n */\npublic external open class DOMPoint : DOMPointReadOnly {\n   constructor(point: DOMPointInit)\n   constructor(x: Double = definedExternally, y: Double = definedExternally, z: Double = definedExternally, w: Double = definedExternally)\n   override var x: Double\n   override var y: Double\n   override var z: Double\n   override var w: Double\n}\n\npublic external interface DOMPointInit {\n   var x: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var y: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var z: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var w: Double? /* = 1.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun DOMPointInit(x: Double? = 0.0, y: Double? = 0.0, z: Double? = 0.0, w: Double? = 1.0): DOMPointInit {\n   val o = js(\"({})\")\n\n   o[\"x\"] = x\n   o[\"y\"] = y\n   o[\"z\"] = z\n   o[\"w\"] = w\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [DOMRect](https://developer.mozilla.org/en/docs/Web/API/DOMRect) to Kotlin\n */\npublic external open class DOMRect(x: Double = definedExternally, y: Double = definedExternally, width: Double = definedExternally, height: Double = definedExternally) : DOMRectReadOnly {\n   override var x: Double\n   override var y: Double\n   override var width: Double\n   override var height: Double\n}\n\n/**\n * Exposes the JavaScript [DOMRectReadOnly](https://developer.mozilla.org/en/docs/Web/API/DOMRectReadOnly) to Kotlin\n */\npublic external open class DOMRectReadOnly(x: Double, y: Double, width: Double, height: Double) {\n   open val x: Double\n   open val y: Double\n   open val width: Double\n   open val height: Double\n   open val top: Double\n   open val right: Double\n   open val bottom: Double\n   open val left: Double\n}\n\npublic external interface DOMRectInit {\n   var x: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var y: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var width: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var height: Double? /* = 0.0 */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun DOMRectInit(x: Double? = 0.0, y: Double?

= 0.0, width: Double? = 0.0, height: Double? = 0.0): DOMRectInit {\n   val o = js(\"({})\")\n\n   o[\"x\"] = x\n o[\"y\"] = y\n   o[\"width\"] = width\n   o[\"height\"] = height\n\n   return o\n}\n\npublic external interface DOMRectList : ItemArrayLike<DOMRect> {\n   override fun item(index: Int): DOMRect?\n}\n@kotlin.internal.InlineOnly inline operator fun DOMRectList.get(index: Int): DOMRect? = asDynamic()[index]\n\npublic external open class DOMQuad {\n   constructor(p1: DOMPointInit = definedExternally, p2: DOMPointInit = definedExternally, p3: DOMPointInit = definedExternally, p4: DOMPointInit = definedExternally)\n   constructor(rect: DOMRectInit)\n   open val p1: DOMPoint\n   open val p2: DOMPoint\n   open val p3: DOMPoint\n   open val p4: DOMPoint\n   open val bounds: DOMRectReadOnly\n}\n\n/**\n * Exposes the JavaScript [DOMMatrixReadOnly](https://developer.mozilla.org/en/docs/Web/API/DOMMatrixReadOnly) to Kotlin\n */\npublic external open class DOMMatrixReadOnly(numberSequence: Array<Double>) {\n   open val a: Double\n   open val b: Double\n   open val c: Double\n   open val d: Double\n   open val e: Double\n   open val f: Double\n   open val m11: Double\n   open val m12: Double\n   open val m13: Double\n   open val m14: Double\n   open val m21: Double\n   open val m22: Double\n   open val m23: Double\n   open val m24: Double\n   open val m31: Double\n   open val m32: Double\n   open val m33: Double\n   open val m34: Double\n   open val m41: Double\n   open val m42: Double\n   open val m43: Double\n   open val m44: Double\n   open val is2D: Boolean\n   open val isIdentity: Boolean\n   fun translate(tx: Double, ty: Double, tz: Double = definedExternally): DOMMatrix\n   fun scale(scale: Double, originX: Double = definedExternally, originY: Double = definedExternally): DOMMatrix\n   fun scale3d(scale: Double, originX: Double = definedExternally, originY: Double = definedExternally, originZ: Double = definedExternally): DOMMatrix\n   fun scaleNonUniform(scaleX: Double, scaleY: Double = definedExternally, scaleZ: Double = definedExternally, originX: Double = definedExternally, originY: Double = definedExternally, originZ: Double = definedExternally): DOMMatrix\n   fun rotate(angle: Double, originX: Double = definedExternally, originY: Double = definedExternally): DOMMatrix\n   fun rotateFromVector(x: Double, y: Double): DOMMatrix\n   fun rotateAxisAngle(x: Double, y: Double, z: Double, angle: Double): DOMMatrix\n   fun skewX(sx: Double): DOMMatrix\n   fun skewY(sy: Double): DOMMatrix\n   fun multiply(other: DOMMatrix): DOMMatrix\n   fun flipX(): DOMMatrix\n   fun flipY(): DOMMatrix\n   fun inverse(): DOMMatrix\n   fun transformPoint(point: DOMPointInit = definedExternally): DOMPoint\n   fun toFloat32Array(): Float32Array\n   fun toFloat64Array(): Float64Array\n}\n\n/**\n * Exposes the JavaScript [DOMMatrix](https://developer.mozilla.org/en/docs/Web/API/DOMMatrix) to Kotlin\n */\npublic external open class DOMMatrix() : DOMMatrixReadOnly {\n   constructor(transformList: String)\n   constructor(other: DOMMatrixReadOnly)\n   constructor(array32: Float32Array)\n   constructor(array64: Float64Array)\n   constructor(numberSequence: Array<Double>)\n   override var a: Double\n   override var b: Double\n   override var c: Double\n   override var d: Double\n   override var e: Double\n   override var f: Double\n   override var m11: Double\n   override var m12: Double\n   override var m13: Double\n   override var m14: Double\n   override var m21: Double\n   override var m22: Double\n   override var m23: Double\n   override var m24: Double\n   override var m31: Double\n   override var m32: Double\n   override var m33: Double\n   override var m34: Double\n   override var m41: Double\n   override var m42: Double\n   override var m43: Double\n   override var m44: Double\n   fun multiplySelf(other: DOMMatrix): DOMMatrix\n   fun preMultiplySelf(other: DOMMatrix): DOMMatrix\n   fun translateSelf(tx: Double, ty: Double, tz: Double = definedExternally): DOMMatrix\n   fun scaleSelf(scale: Double, originX: Double = definedExternally, originY: Double = definedExternally): DOMMatrix\n   fun scale3dSelf(scale: Double, originX: Double = definedExternally, originY: Double = definedExternally, originZ: Double = definedExternally): DOMMatrix\n   fun scaleNonUniformSelf(scaleX: Double, scaleY: Double = definedExternally, scaleZ: Double = definedExternally, originX: Double = definedExternally, originY: Double = definedExternally, originZ: Double = definedExternally): DOMMatrix\n   fun rotateSelf(angle: Double, originX: Double = definedExternally, originY: Double = definedExternally): DOMMatrix\n   fun rotateFromVectorSelf(x: Double, y: Double): DOMMatrix\n   fun rotateAxisAngleSelf(x: Double, y: Double, z: Double, angle: Double): DOMMatrix\n   fun skewXSelf(sx: Double): DOMMatrix\n   fun skewYSelf(sy: Double): DOMMatrix\n   fun invertSelf(): DOMMatrix\n   fun setMatrixValue(transformList: String): DOMMatrix\n}\n\npublic external

interface ScrollOptions {\n   var behavior: ScrollBehavior? /* = ScrollBehavior.AUTO */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ScrollOptions(behavior: ScrollBehavior? = ScrollBehavior.AUTO): ScrollOptions {\n   val o = js(\"({})\")\n\n   o[\"behavior\"] = behavior\n\n   return o\n}\n\npublic external interface ScrollToOptions : ScrollOptions {\n   var left: Double?\n   get() = definedExternally\n   set(value) = definedExternally\n   var top: Double?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ScrollToOptions(left: Double? = null, top: Double? = null, behavior: ScrollBehavior? = ScrollBehavior.AUTO): ScrollToOptions {\n   val o = js(\"({})\")\n\n   o[\"left\"] = left\n   o[\"top\"] = top\n   o[\"behavior\"] = behavior\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [MediaQueryList](https://developer.mozilla.org/en/docs/Web/API/MediaQueryList) to Kotlin\n */\npublic external abstract class MediaQueryList : EventTarget {\n   open val media: String\n   open val matches: Boolean\n   open var onchange: ((Event) -> dynamic)?\n   fun addListener(listener: EventListener?): Unit\n   fun addListener(listener: ((Event) -> Unit)?): Unit\n   fun removeListener(listener: EventListener?): Unit\n   fun removeListener(listener: ((Event) -> Unit)?): Unit\n}\n\npublic external open class MediaQueryListEvent(type: String, eventInitDict: MediaQueryListEventInit = definedExternally) : Event {\n   open val media: String\n   open val matches: Boolean\n}\n\npublic external interface MediaQueryListEventInit : EventInit {\n   var media: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var matches: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun MediaQueryListEventInit(media: String? = \"\", matches: Boolean? = false, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): MediaQueryListEventInit {\n   val o = js(\"({})\")\n\n   o[\"media\"] = media\n   o[\"matches\"] = matches\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [Screen](https://developer.mozilla.org/en/docs/Web/API/Screen) to Kotlin\n */\npublic external abstract class Screen {\n   open val availWidth: Int\n   open val availHeight: Int\n   open val width: Int\n   open val height: Int\n   open val colorDepth: Int\n   open val pixelDepth: Int\n}\n\n/**\n * Exposes the JavaScript [CaretPosition](https://developer.mozilla.org/en/docs/Web/API/CaretPosition) to Kotlin\n */\npublic external abstract class CaretPosition {\n   open val offsetNode: Node\n   open val offset: Int\n   fun getClientRect(): DOMRect?\n}\n\npublic external interface ScrollIntoViewOptions : ScrollOptions {\n   var block: ScrollLogicalPosition? /* = ScrollLogicalPosition.CENTER */\n   get() = definedExternally\n   set(value) = definedExternally\n   var inline: ScrollLogicalPosition? /* = ScrollLogicalPosition.CENTER */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ScrollIntoViewOptions(block: ScrollLogicalPosition? = ScrollLogicalPosition.CENTER, inline: ScrollLogicalPosition? = ScrollLogicalPosition.CENTER, behavior: ScrollBehavior? = ScrollBehavior.AUTO): ScrollIntoViewOptions {\n   val o = js(\"({})\")\n\n   o[\"block\"] = block\n   o[\"inline\"] = inline\n   o[\"behavior\"] = behavior\n\n   return o\n}\n\npublic external interface BoxQuadOptions {\n   var box: CSSBoxType? /* = CSSBoxType.BORDER */\n   get() = definedExternally\n   set(value) = definedExternally\n   var relativeTo: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun BoxQuadOptions(box: CSSBoxType? = CSSBoxType.BORDER, relativeTo: dynamic = null): BoxQuadOptions {\n   val o = js(\"({})\")\n\n   o[\"box\"] = box\n   o[\"relativeTo\"] = relativeTo\n\n   return o\n}\n\npublic external interface ConvertCoordinateOptions {\n   var fromBox: CSSBoxType? /* = CSSBoxType.BORDER */\n   get() = definedExternally\n   set(value) = definedExternally\n   var toBox: CSSBoxType? /* = CSSBoxType.BORDER */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ConvertCoordinateOptions(fromBox: CSSBoxType? = CSSBoxType.BORDER, toBox: CSSBoxType? = CSSBoxType.BORDER): ConvertCoordinateOptions {\n   val o = js(\"({})\")\n\n   o[\"fromBox\"] = fromBox\n   o[\"toBox\"] = toBox\n\n   return o\n}\n\npublic external interface GeometryUtils {\n   fun getBoxQuads(options: BoxQuadOptions = definedExternally): Array<DOMQuad>\n   fun convertQuadFromNode(quad: dynamic, from: dynamic, options: ConvertCoordinateOptions = definedExternally): DOMQuad\n   fun convertRectFromNode(rect:

DOMRectReadOnly, from: dynamic, options: ConvertCoordinateOptions = definedExternally): DOMQuad\n   fun convertPointFromNode(point: DOMPointInit, from: dynamic, options: ConvertCoordinateOptions = definedExternally): DOMPoint\n}\n\npublic external @marker interface UnionElementOrProcessingInstruction {\n}\n\npublic external @marker interface UnionElementOrHTMLCollection {\n}\n\npublic external @marker interface UnionElementOrRadioNodeList {\n}\n\npublic external @marker interface UnionHTMLOptGroupElementOrHTMLOptionElement {\n}\n\npublic external @marker interface UnionAudioTrackOrTextTrackOrVideoTrack {\n}\n\npublic external @marker interface UnionElementOrMouseEvent {\n}\n\npublic external @marker interface UnionMessagePortOrWindow {\n}\n\npublic external @marker interface UnionMessagePortOrServiceWorker {\n}\n\npublic external @marker interface HTMLOrSVGScriptElement {\n}\n\npublic external @marker interface RenderingContext {\n}\n\npublic external @marker interface HTMLOrSVGImageElement {\n}\n\n/* please, don't implement this interface! */\npublic external interface DocumentReadyState {\n   companion object\n}\npublic inline val DocumentReadyState.Companion.LOADING: DocumentReadyState get() = \"loading\".asDynamic().unsafeCast<DocumentReadyState>()\npublic inline val DocumentReadyState.Companion.INTERACTIVE: DocumentReadyState get() = \"interactive\".asDynamic().unsafeCast<DocumentReadyState>()\npublic inline val DocumentReadyState.Companion.COMPLETE: DocumentReadyState get() = \"complete\".asDynamic().unsafeCast<DocumentReadyState>()\n\n/* please, don't implement this interface! */\npublic external interface CanPlayTypeResult {\n   companion object\n}\npublic inline val CanPlayTypeResult.Companion.EMPTY: CanPlayTypeResult get() = \"\".asDynamic().unsafeCast<CanPlayTypeResult>()\npublic inline val CanPlayTypeResult.Companion.MAYBE: CanPlayTypeResult get() = \"maybe\".asDynamic().unsafeCast<CanPlayTypeResult>()\npublic inline val CanPlayTypeResult.Companion.PROBABLY: CanPlayTypeResult get() = \"probably\".asDynamic().unsafeCast<CanPlayTypeResult>()\n\n/* please, don't implement this interface! */\npublic external interface TextTrackMode {\n   companion object\n}\npublic inline val TextTrackMode.Companion.DISABLED: TextTrackMode get() = \"disabled\".asDynamic().unsafeCast<TextTrackMode>()\npublic inline val TextTrackMode.Companion.HIDDEN: TextTrackMode get() = \"hidden\".asDynamic().unsafeCast<TextTrackMode>()\npublic inline val TextTrackMode.Companion.SHOWING: TextTrackMode get() = \"showing\".asDynamic().unsafeCast<TextTrackMode>()\n\n/* please, don't implement this interface! */\npublic external interface TextTrackKind {\n   companion object\n}\npublic inline val TextTrackKind.Companion.SUBTITLES: TextTrackKind get() = \"subtitles\".asDynamic().unsafeCast<TextTrackKind>()\npublic inline val TextTrackKind.Companion.CAPTIONS: TextTrackKind get() = \"captions\".asDynamic().unsafeCast<TextTrackKind>()\npublic inline val TextTrackKind.Companion.DESCRIPTIONS: TextTrackKind get() = \"descriptions\".asDynamic().unsafeCast<TextTrackKind>()\npublic inline val TextTrackKind.Companion.CHAPTERS: TextTrackKind get() = \"chapters\".asDynamic().unsafeCast<TextTrackKind>()\npublic inline val TextTrackKind.Companion.METADATA: TextTrackKind get() = \"metadata\".asDynamic().unsafeCast<TextTrackKind>()\n\n/* please, don't implement this interface! */\npublic external interface SelectionMode {\n   companion object\n}\npublic inline val SelectionMode.Companion.SELECT: SelectionMode get() = \"select\".asDynamic().unsafeCast<SelectionMode>()\npublic inline val SelectionMode.Companion.START: SelectionMode get() = \"start\".asDynamic().unsafeCast<SelectionMode>()\npublic inline val SelectionMode.Companion.END: SelectionMode get() = \"end\".asDynamic().unsafeCast<SelectionMode>()\npublic inline val SelectionMode.Companion.PRESERVE: SelectionMode get() = \"preserve\".asDynamic().unsafeCast<SelectionMode>()\n\n/* please, don't implement this interface! */\npublic external interface CanvasFillRule {\n   companion object\n}\npublic inline val

CanvasFillRule.Companion.NONZERO: CanvasFillRule get() =
\"nonzero\".asDynamic().unsafeCast<CanvasFillRule>()\npublic inline val CanvasFillRule.Companion.EVENODD:
CanvasFillRule get() = \"evenodd\".asDynamic().unsafeCast<CanvasFillRule>()\n\n/* please, don't implement this
interface! */\npublic external interface ImageSmoothingQuality {\n   companion object\n}\npublic inline val
ImageSmoothingQuality.Companion.LOW: ImageSmoothingQuality get() =
\"low\".asDynamic().unsafeCast<ImageSmoothingQuality>()\npublic inline val
ImageSmoothingQuality.Companion.MEDIUM: ImageSmoothingQuality get() =
\"medium\".asDynamic().unsafeCast<ImageSmoothingQuality>()\npublic inline val
ImageSmoothingQuality.Companion.HIGH: ImageSmoothingQuality get() =
\"high\".asDynamic().unsafeCast<ImageSmoothingQuality>()\n\n/* please, don't implement this interface!
*/\npublic external interface CanvasLineCap {\n   companion object\n}\npublic inline val
CanvasLineCap.Companion.BUTT: CanvasLineCap get() =
\"butt\".asDynamic().unsafeCast<CanvasLineCap>()\npublic inline val CanvasLineCap.Companion.ROUND:
CanvasLineCap get() = \"round\".asDynamic().unsafeCast<CanvasLineCap>()\npublic inline val
CanvasLineCap.Companion.SQUARE: CanvasLineCap get() =
\"square\".asDynamic().unsafeCast<CanvasLineCap>()\n\n/* please, don't implement this interface! */\npublic
external interface CanvasLineJoin {\n   companion object\n}\npublic inline val
CanvasLineJoin.Companion.ROUND: CanvasLineJoin get() =
\"round\".asDynamic().unsafeCast<CanvasLineJoin>()\npublic inline val CanvasLineJoin.Companion.BEVEL:
CanvasLineJoin get() = \"bevel\".asDynamic().unsafeCast<CanvasLineJoin>()\npublic inline val
CanvasLineJoin.Companion.MITER: CanvasLineJoin get() =
\"miter\".asDynamic().unsafeCast<CanvasLineJoin>()\n\n/* please, don't implement this interface! */\npublic
external interface CanvasTextAlign {\n   companion object\n}\npublic inline val
CanvasTextAlign.Companion.START: CanvasTextAlign get() =
\"start\".asDynamic().unsafeCast<CanvasTextAlign>()\npublic inline val CanvasTextAlign.Companion.END:
CanvasTextAlign get() = \"end\".asDynamic().unsafeCast<CanvasTextAlign>()\npublic inline val
CanvasTextAlign.Companion.LEFT: CanvasTextAlign get() =
\"left\".asDynamic().unsafeCast<CanvasTextAlign>()\npublic inline val CanvasTextAlign.Companion.RIGHT:
CanvasTextAlign get() = \"right\".asDynamic().unsafeCast<CanvasTextAlign>()\npublic inline val
CanvasTextAlign.Companion.CENTER: CanvasTextAlign get() =
\"center\".asDynamic().unsafeCast<CanvasTextAlign>()\n\n/* please, don't implement this interface! */\npublic
external interface CanvasTextBaseline {\n   companion object\n}\npublic inline val
CanvasTextBaseline.Companion.TOP: CanvasTextBaseline get() =
\"top\".asDynamic().unsafeCast<CanvasTextBaseline>()\npublic inline val
CanvasTextBaseline.Companion.HANGING: CanvasTextBaseline get() =
\"hanging\".asDynamic().unsafeCast<CanvasTextBaseline>()\npublic inline val
CanvasTextBaseline.Companion.MIDDLE: CanvasTextBaseline get() =
\"middle\".asDynamic().unsafeCast<CanvasTextBaseline>()\npublic inline val
CanvasTextBaseline.Companion.ALPHABETIC: CanvasTextBaseline get() =
\"alphabetic\".asDynamic().unsafeCast<CanvasTextBaseline>()\npublic inline val
CanvasTextBaseline.Companion.IDEOGRAPHIC: CanvasTextBaseline get() =
\"ideographic\".asDynamic().unsafeCast<CanvasTextBaseline>()\npublic inline val
CanvasTextBaseline.Companion.BOTTOM: CanvasTextBaseline get() =
\"bottom\".asDynamic().unsafeCast<CanvasTextBaseline>()\n\n/* please, don't implement this interface! */\npublic
external interface CanvasDirection {\n   companion object\n}\npublic inline val CanvasDirection.Companion.LTR:
CanvasDirection get() = \"ltr\".asDynamic().unsafeCast<CanvasDirection>()\npublic inline val
CanvasDirection.Companion.RTL: CanvasDirection get() =
\"rtl\".asDynamic().unsafeCast<CanvasDirection>()\npublic inline val CanvasDirection.Companion.INHERIT:

CanvasDirection get() = \"inherit\".asDynamic().unsafeCast<CanvasDirection>()\n\n/* please, don't implement this interface! */\npublic external interface ScrollRestoration {\n   companion object\n}\npublic inline val ScrollRestoration.Companion.AUTO: ScrollRestoration get() = \"auto\".asDynamic().unsafeCast<ScrollRestoration>()\npublic inline val ScrollRestoration.Companion.MANUAL: ScrollRestoration get() = \"manual\".asDynamic().unsafeCast<ScrollRestoration>()\n\n/* please, don't implement this interface! */\npublic external interface ImageOrientation {\n   companion object\n}\npublic inline val ImageOrientation.Companion.NONE: ImageOrientation get() = \"none\".asDynamic().unsafeCast<ImageOrientation>()\npublic inline val ImageOrientation.Companion.FLIPY: ImageOrientation get() = \"flipY\".asDynamic().unsafeCast<ImageOrientation>()\n\n/* please, don't implement this interface! */\npublic external interface PremultiplyAlpha {\n   companion object\n}\npublic inline val PremultiplyAlpha.Companion.NONE: PremultiplyAlpha get() = \"none\".asDynamic().unsafeCast<PremultiplyAlpha>()\npublic inline val PremultiplyAlpha.Companion.PREMULTIPLY: PremultiplyAlpha get() = \"premultiply\".asDynamic().unsafeCast<PremultiplyAlpha>()\npublic inline val PremultiplyAlpha.Companion.DEFAULT: PremultiplyAlpha get() = \"default\".asDynamic().unsafeCast<PremultiplyAlpha>()\n\n/* please, don't implement this interface! */\npublic external interface ColorSpaceConversion {\n   companion object\n}\npublic inline val ColorSpaceConversion.Companion.NONE: ColorSpaceConversion get() = \"none\".asDynamic().unsafeCast<ColorSpaceConversion>()\npublic inline val ColorSpaceConversion.Companion.DEFAULT: ColorSpaceConversion get() = \"default\".asDynamic().unsafeCast<ColorSpaceConversion>()\n\n/* please, don't implement this interface! */\npublic external interface ResizeQuality {\n   companion object\n}\npublic inline val ResizeQuality.Companion.PIXELATED: ResizeQuality get() = \"pixelated\".asDynamic().unsafeCast<ResizeQuality>()\npublic inline val ResizeQuality.Companion.LOW: ResizeQuality get() = \"low\".asDynamic().unsafeCast<ResizeQuality>()\npublic inline val ResizeQuality.Companion.MEDIUM: ResizeQuality get() = \"medium\".asDynamic().unsafeCast<ResizeQuality>()\npublic inline val ResizeQuality.Companion.HIGH: ResizeQuality get() = \"high\".asDynamic().unsafeCast<ResizeQuality>()\n\n/* please, don't implement this interface! */\npublic external interface BinaryType {\n   companion object\n}\npublic inline val BinaryType.Companion.BLOB: BinaryType get() = \"blob\".asDynamic().unsafeCast<BinaryType>()\npublic inline val BinaryType.Companion.ARRAYBUFFER: BinaryType get() = \"arraybuffer\".asDynamic().unsafeCast<BinaryType>()\n\n/* please, don't implement this interface! */\npublic external interface WorkerType {\n   companion object\n}\npublic inline val WorkerType.Companion.CLASSIC: WorkerType get() = \"classic\".asDynamic().unsafeCast<WorkerType>()\npublic inline val WorkerType.Companion.MODULE: WorkerType get() = \"module\".asDynamic().unsafeCast<WorkerType>()\n\n/* please, don't implement this interface! */\npublic external interface ShadowRootMode {\n   companion object\n}\npublic inline val ShadowRootMode.Companion.OPEN: ShadowRootMode get() = \"open\".asDynamic().unsafeCast<ShadowRootMode>()\npublic inline val ShadowRootMode.Companion.CLOSED: ShadowRootMode get() = \"closed\".asDynamic().unsafeCast<ShadowRootMode>()\n\n/* please, don't implement this interface! */\npublic external interface ScrollBehavior {\n   companion object\n}\npublic inline val ScrollBehavior.Companion.AUTO: ScrollBehavior get() = \"auto\".asDynamic().unsafeCast<ScrollBehavior>()\npublic inline val ScrollBehavior.Companion.INSTANT: ScrollBehavior get() = \"instant\".asDynamic().unsafeCast<ScrollBehavior>()\npublic inline val ScrollBehavior.Companion.SMOOTH: ScrollBehavior get() = \"smooth\".asDynamic().unsafeCast<ScrollBehavior>()\n\n/* please, don't implement this interface! */\npublic external interface ScrollLogicalPosition {\n   companion object\n}\npublic inline val ScrollLogicalPosition.Companion.START: ScrollLogicalPosition get() =

\"start\".asDynamic().unsafeCast<ScrollLogicalPosition>()\npublic inline val ScrollLogicalPosition.Companion.CENTER: ScrollLogicalPosition get() = \"center\".asDynamic().unsafeCast<ScrollLogicalPosition>()\npublic inline val ScrollLogicalPosition.Companion.END: ScrollLogicalPosition get() = \"end\".asDynamic().unsafeCast<ScrollLogicalPosition>()\npublic inline val ScrollLogicalPosition.Companion.NEAREST: ScrollLogicalPosition get() = \"nearest\".asDynamic().unsafeCast<ScrollLogicalPosition>()\n\n/* please, don't implement this interface! */\npublic external interface CSSBoxType {\n   companion object\n}\npublic inline val CSSBoxType.Companion.MARGIN: CSSBoxType get() = \"margin\".asDynamic().unsafeCast<CSSBoxType>()\npublic inline val CSSBoxType.Companion.BORDER: CSSBoxType get() = \"border\".asDynamic().unsafeCast<CSSBoxType>()\npublic inline val CSSBoxType.Companion.PADDING: CSSBoxType get() = \"padding\".asDynamic().unsafeCast<CSSBoxType>()\npublic inline val CSSBoxType.Companion.CONTENT: CSSBoxType get() = \"content\".asDynamic().unsafeCast<CSSBoxType>()\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.fetch\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [Headers](https://developer.mozilla.org/en/docs/Web/API/Headers) to Kotlin\n */\npublic external open class Headers(init: dynamic = definedExternally) {\n   fun append(name: String, value: String): Unit\n   fun delete(name: String): Unit\n   fun get(name: String): String?\n   fun has(name: String): Boolean\n   fun set(name: String, value: String): Unit\n}\n\n/**\n * Exposes the JavaScript [Body](https://developer.mozilla.org/en/docs/Web/API/Body) to Kotlin\n */\npublic external interface Body {\n   val bodyUsed: Boolean\n   fun arrayBuffer(): Promise<ArrayBuffer>\n   fun blob(): Promise<Blob>\n   fun formData(): Promise<FormData>\n   fun json(): Promise<Any?>\n   fun text(): Promise<String>\n}\n\n/**\n * Exposes the JavaScript [Request](https://developer.mozilla.org/en/docs/Web/API/Request) to Kotlin\n */\npublic external open class Request(input: dynamic, init: RequestInit = definedExternally) : Body {\n   open val method: String\n   open val url: String\n   open val headers: Headers\n   open val type: RequestType\n   open val destination: RequestDestination\n   open val referrer: String\n   open val referrerPolicy: dynamic\n   open val mode: RequestMode\n   open val credentials: RequestCredentials\n   open val cache: RequestCache\n   open val redirect: RequestRedirect\n   open val integrity: String\n   open val keepalive: Boolean\n   override val bodyUsed: Boolean\n   fun clone(): Request\n   override fun arrayBuffer(): Promise<ArrayBuffer>\n   override fun blob(): Promise<Blob>\n   override fun formData(): Promise<FormData>\n   override fun json(): Promise<Any?>\n   override fun text(): Promise<String>\n}\n\npublic external interface RequestInit {\n   var method: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var headers: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n   var body: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n   var referrer: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var referrerPolicy: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n   var mode: RequestMode?\n   get() = definedExternally\n   set(value) = definedExternally\n   var credentials: RequestCredentials?\n   get() = definedExternally\n   set(value) = definedExternally\n   var cache: RequestCache?\n   get() = definedExternally\n   set(value) = definedExternally\n   var redirect: RequestRedirect?\n   get() = definedExternally\n   set(value) = definedExternally\n   var integrity: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var keepalive: Boolean?\n   get() = definedExternally\n   set(value) = definedExternally\n   var window: Any?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun RequestInit(method: String? = null, headers:

dynamic = null, body: dynamic = null, referrer: String? = null, referrerPolicy: dynamic = null, mode: RequestMode? = null, credentials: RequestCredentials? = null, cache: RequestCache? = null, redirect: RequestRedirect? = null, integrity: String? = null, keepalive: Boolean? = null, window: Any? = null): RequestInit {\n   val o = js(\"({})\")\n\n o[\"method\"] = method\n   o[\"headers\"] = headers\n   o[\"body\"] = body\n   o[\"referrer\"] = referrer\n o[\"referrerPolicy\"] = referrerPolicy\n   o[\"mode\"] = mode\n   o[\"credentials\"] = credentials\n   o[\"cache\"] = cache\n   o[\"redirect\"] = redirect\n   o[\"integrity\"] = integrity\n   o[\"keepalive\"] = keepalive\n   o[\"window\"] = window\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [Response](https://developer.mozilla.org/en/docs/Web/API/Response) to Kotlin\n */\npublic external open class Response(body: dynamic = definedExternally, init: ResponseInit = definedExternally) : Body {\n   open val type: ResponseType\n   open val url: String\n   open val redirected: Boolean\n   open val status: Short\n   open val ok: Boolean\n   open val statusText: String\n   open val headers: Headers\n   open val body: dynamic\n   open val trailer: Promise<Headers>\n   override val bodyUsed: Boolean\n   fun clone(): Response\n   override fun arrayBuffer(): Promise<ArrayBuffer>\n   override fun blob(): Promise<Blob>\n   override fun formData(): Promise<FormData>\n   override fun json(): Promise<Any?>\n   override fun text(): Promise<String>\n\n   companion object {\n   fun error(): Response\n   fun redirect(url: String, status: Short = definedExternally): Response\n   }\n}\n\npublic external interface ResponseInit {\n   var status: Short? /* = 200 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var statusText: String? /* = \"OK\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var headers: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ResponseInit(status: Short? = 200, statusText: String? = \"OK\", headers: dynamic = null): ResponseInit {\n   val o = js(\"({})\")\n\n o[\"status\"] = status\n   o[\"statusText\"] = statusText\n   o[\"headers\"] = headers\n\n   return o\n}\n\n/* please, don't implement this interface! */\npublic external interface RequestType {\n   companion object\n}\npublic inline val RequestType.Companion.EMPTY: RequestType get() = \"\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.AUDIO: RequestType get() = \"audio\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.FONT: RequestType get() = \"font\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.IMAGE: RequestType get() = \"image\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.SCRIPT: RequestType get() = \"script\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.STYLE: RequestType get() = \"style\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.TRACK: RequestType get() = \"track\".asDynamic().unsafeCast<RequestType>()\npublic inline val RequestType.Companion.VIDEO: RequestType get() = \"video\".asDynamic().unsafeCast<RequestType>()\n\n/* please, don't implement this interface! */\npublic external interface RequestDestination {\n   companion object\n}\npublic inline val RequestDestination.Companion.EMPTY: RequestDestination get() = \"\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.DOCUMENT: RequestDestination get() = \"document\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.EMBED: RequestDestination get() = \"embed\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.FONT: RequestDestination get() = \"font\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.IMAGE: RequestDestination get() = \"image\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.MANIFEST: RequestDestination get() = \"manifest\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.MEDIA: RequestDestination get() = \"media\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.OBJECT: RequestDestination get() =

\"object\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.REPORT: RequestDestination get() = \"report\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.SCRIPT: RequestDestination get() = \"script\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.SERVICEWORKER: RequestDestination get() = \"serviceworker\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.SHAREDWORKER: RequestDestination get() = \"sharedworker\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.STYLE: RequestDestination get() = \"style\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.WORKER: RequestDestination get() = \"worker\".asDynamic().unsafeCast<RequestDestination>()\npublic inline val RequestDestination.Companion.XSLT: RequestDestination get() = \"xslt\".asDynamic().unsafeCast<RequestDestination>()\n\n/* please, don't implement this interface! */\npublic external interface RequestMode {\n   companion object\n}\npublic inline val RequestMode.Companion.NAVIGATE: RequestMode get() = \"navigate\".asDynamic().unsafeCast<RequestMode>()\npublic inline val RequestMode.Companion.SAME_ORIGIN: RequestMode get() = \"same-origin\".asDynamic().unsafeCast<RequestMode>()\npublic inline val RequestMode.Companion.NO_CORS: RequestMode get() = \"no-cors\".asDynamic().unsafeCast<RequestMode>()\npublic inline val RequestMode.Companion.CORS: RequestMode get() = \"cors\".asDynamic().unsafeCast<RequestMode>()\n\n/* please, don't implement this interface! */\npublic external interface RequestCredentials {\n   companion object\n}\npublic inline val RequestCredentials.Companion.OMIT: RequestCredentials get() = \"omit\".asDynamic().unsafeCast<RequestCredentials>()\npublic inline val RequestCredentials.Companion.SAME_ORIGIN: RequestCredentials get() = \"same-origin\".asDynamic().unsafeCast<RequestCredentials>()\npublic inline val RequestCredentials.Companion.INCLUDE: RequestCredentials get() = \"include\".asDynamic().unsafeCast<RequestCredentials>()\n\n/* please, don't implement this interface! */\npublic external interface RequestCache {\n   companion object\n}\npublic inline val RequestCache.Companion.DEFAULT: RequestCache get() = \"default\".asDynamic().unsafeCast<RequestCache>()\npublic inline val RequestCache.Companion.NO_STORE: RequestCache get() = \"no-store\".asDynamic().unsafeCast<RequestCache>()\npublic inline val RequestCache.Companion.RELOAD: RequestCache get() = \"reload\".asDynamic().unsafeCast<RequestCache>()\npublic inline val RequestCache.Companion.NO_CACHE: RequestCache get() = \"no-cache\".asDynamic().unsafeCast<RequestCache>()\npublic inline val RequestCache.Companion.FORCE_CACHE: RequestCache get() = \"force-cache\".asDynamic().unsafeCast<RequestCache>()\npublic inline val RequestCache.Companion.ONLY_IF_CACHED: RequestCache get() = \"only-if-cached\".asDynamic().unsafeCast<RequestCache>()\n\n/* please, don't implement this interface! */\npublic external interface RequestRedirect {\n   companion object\n}\npublic inline val RequestRedirect.Companion.FOLLOW: RequestRedirect get() = \"follow\".asDynamic().unsafeCast<RequestRedirect>()\npublic inline val RequestRedirect.Companion.ERROR: RequestRedirect get() = \"error\".asDynamic().unsafeCast<RequestRedirect>()\npublic inline val RequestRedirect.Companion.MANUAL: RequestRedirect get() = \"manual\".asDynamic().unsafeCast<RequestRedirect>()\n\n/* please, don't implement this interface! */\npublic external interface ResponseType {\n   companion object\n}\npublic inline val ResponseType.Companion.BASIC: ResponseType get() = \"basic\".asDynamic().unsafeCast<ResponseType>()\npublic inline val ResponseType.Companion.CORS:

ResponseType get() = \"cors\".asDynamic().unsafeCast<ResponseType>()\npublic inline val ResponseType.Companion.DEFAULT: ResponseType get() = \"default\".asDynamic().unsafeCast<ResponseType>()\npublic inline val ResponseType.Companion.ERROR: ResponseType get() = \"error\".asDynamic().unsafeCast<ResponseType>()\npublic inline val ResponseType.Companion.OPAQUE: ResponseType get() = \"opaque\".asDynamic().unsafeCast<ResponseType>()\npublic inline val ResponseType.Companion.OPAQUEREDIRECT: ResponseType get() = \"opaqueredirect\".asDynamic().unsafeCast<ResponseType>()\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.dom.svg\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [SVGElement](https://developer.mozilla.org/en/docs/Web/API/SVGElement) to Kotlin\n */\npublic external abstract class SVGElement : Element, ElementCSSInlineStyle, GlobalEventHandlers, SVGElementInstance {\n   open val dataset: DOMStringMap\n   open val ownerSVGElement: SVGSVGElement?\n   open val viewportElement: SVGElement?\n   open var tabIndex: Int\n   fun focus(): Unit\n   fun blur(): Unit\n}\n\npublic external interface SVGBoundingBoxOptions {\n   var fill: Boolean? /* = true */\n   get() = definedExternally\n   set(value) = definedExternally\n   var stroke: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var markers: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var clipped: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun SVGBoundingBoxOptions(fill: Boolean? = true, stroke: Boolean? = false, markers: Boolean? = false, clipped: Boolean? = false): SVGBoundingBoxOptions {\n   val o = js(\"({})\")\n\n   o[\"fill\"] = fill\n   o[\"stroke\"] = stroke\n   o[\"markers\"] = markers\n   o[\"clipped\"] = clipped\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [SVGGraphicsElement](https://developer.mozilla.org/en/docs/Web/API/SVGGraphicsElement) to Kotlin\n */\npublic external abstract class SVGGraphicsElement : SVGElement, SVGTests {\n   open val transform: SVGAnimatedTransformList\n   fun getBBox(options: SVGBoundingBoxOptions = definedExternally): DOMRect\n   fun getCTM(): DOMMatrix?\n   fun getScreenCTM(): DOMMatrix?\n}\n\n/**\n * Exposes the JavaScript [SVGGeometryElement](https://developer.mozilla.org/en/docs/Web/API/SVGGeometryElement) to Kotlin\n */\npublic external abstract class SVGGeometryElement : SVGGraphicsElement {\n   open val pathLength: SVGAnimatedNumber\n   fun isPointInFill(point: DOMPoint): Boolean\n   fun isPointInStroke(point: DOMPoint): Boolean\n   fun getTotalLength(): Float\n   fun getPointAtLength(distance: Float): DOMPoint\n}\n\n/**\n * Exposes the JavaScript [SVGNumber](https://developer.mozilla.org/en/docs/Web/API/SVGNumber) to Kotlin\n */\npublic external abstract class SVGNumber {\n   open var value: Float\n}\n\n/**\n * Exposes the JavaScript [SVGLength](https://developer.mozilla.org/en/docs/Web/API/SVGLength) to Kotlin\n */\npublic external abstract class SVGLength {\n   open val unitType: Short\n   open var value: Float\n   open var valueInSpecifiedUnits: Float\n   open var valueAsString: String\n   fun newValueSpecifiedUnits(unitType: Short, valueInSpecifiedUnits: Float): Unit\n   fun convertToSpecifiedUnits(unitType: Short): Unit\n\n   companion object {\n   val SVG_LENGTHTYPE_UNKNOWN: Short\n   val SVG_LENGTHTYPE_NUMBER: Short\n   val SVG_LENGTHTYPE_PERCENTAGE: Short\n   val SVG_LENGTHTYPE_EMS: Short\n   val SVG_LENGTHTYPE_EXS: Short\n   val SVG_LENGTHTYPE_PX: Short\n   val SVG_LENGTHTYPE_CM: Short\n   val SVG_LENGTHTYPE_MM: Short\n   val SVG_LENGTHTYPE_IN: Short\n   val SVG_LENGTHTYPE_PT: Short\n   val SVG_LENGTHTYPE_PC: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGAngle](https://developer.mozilla.org/en/docs/Web/API/SVGAngle) to Kotlin\n */\npublic external abstract

class SVGAngle {\n   open val unitType: Short\n   open var value: Float\n   open var valueInSpecifiedUnits: Float\n   open var valueAsString: String\n   fun newValueSpecifiedUnits(unitType: Short, valueInSpecifiedUnits: Float): Unit\n   fun convertToSpecifiedUnits(unitType: Short): Unit\n\n   companion object {\n   val SVG_ANGLETYPE_UNKNOWN: Short\n   val SVG_ANGLETYPE_UNSPECIFIED: Short\n   val SVG_ANGLETYPE_DEG: Short\n   val SVG_ANGLETYPE_RAD: Short\n   val SVG_ANGLETYPE_GRAD: Short\n   }\n}\n\n\npublic external abstract class SVGNameList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: dynamic): dynamic\n   fun getItem(index: Int): dynamic\n   fun insertItemBefore(newItem: dynamic, index: Int): dynamic\n   fun replaceItem(newItem: dynamic, index: Int): dynamic\n   fun removeItem(index: Int): dynamic\n   fun appendItem(newItem: dynamic): dynamic\n}\n@kotlin.internal.InlineOnly inline operator fun SVGNameList.get(index: Int): dynamic = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGNameList.set(index: Int, newItem: dynamic): Unit { asDynamic()[index] = newItem; }\n\n/**\n * Exposes the JavaScript [SVGNumberList](https://developer.mozilla.org/en/docs/Web/API/SVGNumberList) to Kotlin\n */\npublic external abstract class SVGNumberList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: SVGNumber): SVGNumber\n   fun getItem(index: Int): SVGNumber\n   fun insertItemBefore(newItem: SVGNumber, index: Int): SVGNumber\n   fun replaceItem(newItem: SVGNumber, index: Int): SVGNumber\n   fun removeItem(index: Int): SVGNumber\n   fun appendItem(newItem: SVGNumber): SVGNumber\n}\n@kotlin.internal.InlineOnly inline operator fun SVGNumberList.get(index: Int): SVGNumber? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGNumberList.set(index: Int, newItem: SVGNumber): Unit { asDynamic()[index] = newItem; }\n\n/**\n * Exposes the JavaScript [SVGLengthList](https://developer.mozilla.org/en/docs/Web/API/SVGLengthList) to Kotlin\n */\npublic external abstract class SVGLengthList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: SVGLength): SVGLength\n   fun getItem(index: Int): SVGLength\n   fun insertItemBefore(newItem: SVGLength, index: Int): SVGLength\n   fun replaceItem(newItem: SVGLength, index: Int): SVGLength\n   fun removeItem(index: Int): SVGLength\n   fun appendItem(newItem: SVGLength): SVGLength\n}\n@kotlin.internal.InlineOnly inline operator fun SVGLengthList.get(index: Int): SVGLength? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGLengthList.set(index: Int, newItem: SVGLength): Unit { asDynamic()[index] = newItem; }\n\n/**\n * Exposes the JavaScript [SVGAnimatedBoolean](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedBoolean) to Kotlin\n */\npublic external abstract class SVGAnimatedBoolean {\n   open var baseVal: Boolean\n   open val animVal: Boolean\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedEnumeration](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedEnumeration) to Kotlin\n */\npublic external abstract class SVGAnimatedEnumeration {\n   open var baseVal: Short\n   open val animVal: Short\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedInteger](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedInteger) to Kotlin\n */\npublic external abstract class SVGAnimatedInteger {\n   open var baseVal: Int\n   open val animVal: Int\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedNumber](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedNumber) to Kotlin\n */\npublic external abstract class SVGAnimatedNumber {\n   open var baseVal: Float\n   open val animVal: Float\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedLength](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedLength) to Kotlin\n */\npublic external abstract class SVGAnimatedLength {\n   open val baseVal: SVGLength\n   open val animVal: SVGLength\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedAngle](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedAngle) to Kotlin\n */\npublic external abstract class SVGAnimatedAngle {\n   open val baseVal: SVGAngle\n   open val animVal: SVGAngle\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedString](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedString) to Kotlin\n */\npublic external abstract class SVGAnimatedString {\n   open var baseVal: String\n   open val animVal: String\n}\n\n/**\n

* Exposes the JavaScript [SVGAnimatedRect](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedRect) to Kotlin\n *\npublic external abstract class SVGAnimatedRect {\n   open val baseVal: DOMRect\n   open val animVal: DOMRectReadOnly\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedNumberList](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedNumberList) to Kotlin\n *\npublic external abstract class SVGAnimatedNumberList {\n   open val baseVal: SVGNumberList\n   open val animVal: SVGNumberList\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedLengthList](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedLengthList) to Kotlin\n *\npublic external abstract class SVGAnimatedLengthList {\n   open val baseVal: SVGLengthList\n   open val animVal: SVGLengthList\n}\n\n/**\n * Exposes the JavaScript [SVGStringList](https://developer.mozilla.org/en/docs/Web/API/SVGStringList) to Kotlin\n *\npublic external abstract class SVGStringList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: String): String\n   fun getItem(index: Int): String\n   fun insertItemBefore(newItem: String, index: Int): String\n   fun replaceItem(newItem: String, index: Int): String\n   fun removeItem(index: Int): String\n   fun appendItem(newItem: String): String\n}\n@kotlin.internal.InlineOnly inline operator fun SVGStringList.get(index: Int): String? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGStringList.set(index: Int, newItem: String): Unit { asDynamic()[index] = newItem; }\n\npublic external interface SVGUnitTypes {\n\n   companion object {\n   val SVG_UNIT_TYPE_UNKNOWN: Short\n   val SVG_UNIT_TYPE_USERSPACEONUSE: Short\n   val SVG_UNIT_TYPE_OBJECTBOUNDINGBOX: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGTests](https://developer.mozilla.org/en/docs/Web/API/SVGTests) to Kotlin\n *\npublic external interface SVGTests {\n   val requiredExtensions: SVGStringList\n   val systemLanguage: SVGStringList\n}\n\npublic external interface SVGFitToViewBox {\n   val viewBox: SVGAnimatedRect\n   val preserveAspectRatio: SVGAnimatedPreserveAspectRatio\n}\n\npublic external interface SVGZoomAndPan {\n   var zoomAndPan: Short\n\n   companion object {\n   val SVG_ZOOMANDPAN_UNKNOWN: Short\n   val SVG_ZOOMANDPAN_DISABLE: Short\n   val SVG_ZOOMANDPAN_MAGNIFY: Short\n   }\n}\n\npublic external interface SVGURIReference {\n   val href: SVGAnimatedString\n}\n\n/**\n * Exposes the JavaScript [SVGSVGElement](https://developer.mozilla.org/en/docs/Web/API/SVGSVGElement) to Kotlin\n *\npublic external abstract class SVGSVGElement : SVGGraphicsElement, SVGFitToViewBox, SVGZoomAndPan, WindowEventHandlers {\n   open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n   open val height: SVGAnimatedLength\n   open var currentScale: Float\n   open val currentTranslate: DOMPointReadOnly\n   fun getIntersectionList(rect: DOMRectReadOnly, referenceElement: SVGElement?): NodeList\n   fun getEnclosureList(rect: DOMRectReadOnly, referenceElement: SVGElement?): NodeList\n   fun checkIntersection(element: SVGElement, rect: DOMRectReadOnly): Boolean\n   fun checkEnclosure(element: SVGElement, rect: DOMRectReadOnly): Boolean\n   fun deselectAll(): Unit\n   fun createSVGNumber(): SVGNumber\n   fun createSVGLength(): SVGLength\n   fun createSVGAngle(): SVGAngle\n   fun createSVGPoint(): DOMPoint\n   fun createSVGMatrix(): DOMMatrix\n   fun createSVGRect(): DOMRect\n   fun createSVGTransform(): SVGTransform\n   fun createSVGTransformFromMatrix(matrix: DOMMatrixReadOnly): SVGTransform\n   fun getElementById(elementId: String): Element\n   fun suspendRedraw(maxWaitMilliseconds: Int): Int\n   fun unsuspendRedraw(suspendHandleID: Int): Unit\n   fun unsuspendRedrawAll(): Unit\n   fun forceRedraw(): Unit\n\n   companion object {\n   val SVG_ZOOMANDPAN_UNKNOWN: Short\n   val SVG_ZOOMANDPAN_DISABLE: Short\n   val SVG_ZOOMANDPAN_MAGNIFY: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGGElement](https://developer.mozilla.org/en/docs/Web/API/SVGGElement) to Kotlin\n *\npublic external abstract class SVGGElement : SVGGraphicsElement {\n}\n\npublic external abstract class SVGUnknownElement : SVGGraphicsElement {\n}\n\n/**\n * Exposes the JavaScript [SVGDefsElement](https://developer.mozilla.org/en/docs/Web/API/SVGDefsElement) to Kotlin\n *\npublic external abstract class SVGDefsElement : SVGGraphicsElement {\n}\n\n/**\n * Exposes the JavaScript [SVGDescElement](https://developer.mozilla.org/en/docs/Web/API/SVGDescElement) to Kotlin\n *\npublic

external abstract class SVGDescElement : SVGElement {\n}\n\npublic external abstract class SVGMetadataElement : SVGElement {\n}\n\n\n/**\n * Exposes the JavaScript [SVGTitleElement](https://developer.mozilla.org/en/docs/Web/API/SVGTitleElement) to Kotlin\n */\npublic external abstract class SVGTitleElement : SVGElement {\n}\n\n\n/**\n * Exposes the JavaScript [SVGSymbolElement](https://developer.mozilla.org/en/docs/Web/API/SVGSymbolElement) to Kotlin\n */\npublic external abstract class SVGSymbolElement : SVGGraphicsElement, SVGFitToViewBox {\n}\n\n\n/**\n * Exposes the JavaScript [SVGUseElement](https://developer.mozilla.org/en/docs/Web/API/SVGUseElement) to Kotlin\n */\npublic external abstract class SVGUseElement : SVGGraphicsElement, SVGURIReference {\n   open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n   open val height: SVGAnimatedLength\n   open val instanceRoot: SVGElement?\n   open val animatedInstanceRoot: SVGElement?\n}\n\npublic external open class SVGUseElementShadowRoot : ShadowRoot {\n   override fun getElementById(elementId: String): Element?\n   override fun prepend(vararg nodes: dynamic): Unit\n   override fun append(vararg nodes: dynamic): Unit\n   override fun querySelector(selectors: String): Element?\n   override fun querySelectorAll(selectors: String): NodeList\n}\n\npublic external interface SVGElementInstance {\n   val correspondingElement: SVGElement?\n   val correspondingUseElement: SVGUseElement?\n}\n\npublic external open class ShadowAnimation(source: dynamic, newTarget: dynamic) {\n   open val sourceAnimation: dynamic\n}\n\n\n/**\n * Exposes the JavaScript [SVGSwitchElement](https://developer.mozilla.org/en/docs/Web/API/SVGSwitchElement) to Kotlin\n */\npublic external abstract class SVGSwitchElement : SVGGraphicsElement {\n}\n\npublic external interface GetSVGDocument {\n   fun getSVGDocument(): Document\n}\n\n\n/**\n * Exposes the JavaScript [SVGStyleElement](https://developer.mozilla.org/en/docs/Web/API/SVGStyleElement) to Kotlin\n */\npublic external abstract class SVGStyleElement : SVGElement, LinkStyle {\n   open var type: String\n   open var media: String\n   open var title: String\n}\n\n\n/**\n * Exposes the JavaScript [SVGTransform](https://developer.mozilla.org/en/docs/Web/API/SVGTransform) to Kotlin\n */\npublic external abstract class SVGTransform {\n   open val type: Short\n   open val matrix: DOMMatrix\n   open val angle: Float\n   fun setMatrix(matrix: DOMMatrixReadOnly): Unit\n   fun setTranslate(tx: Float, ty: Float): Unit\n   fun setScale(sx: Float, sy: Float): Unit\n   fun setRotate(angle: Float, cx: Float, cy: Float): Unit\n   fun setSkewX(angle: Float): Unit\n   fun setSkewY(angle: Float): Unit\n\n   companion object {\n   val SVG_TRANSFORM_UNKNOWN: Short\n   val SVG_TRANSFORM_MATRIX: Short\n   val SVG_TRANSFORM_TRANSLATE: Short\n   val SVG_TRANSFORM_SCALE: Short\n   val SVG_TRANSFORM_ROTATE: Short\n   val SVG_TRANSFORM_SKEWX: Short\n   val SVG_TRANSFORM_SKEWY: Short\n   }\n}\n\n\n/**\n * Exposes the JavaScript [SVGTransformList](https://developer.mozilla.org/en/docs/Web/API/SVGTransformList) to Kotlin\n */\npublic external abstract class SVGTransformList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: SVGTransform): SVGTransform\n   fun getItem(index: Int): SVGTransform\n   fun insertItemBefore(newItem: SVGTransform, index: Int): SVGTransform\n   fun replaceItem(newItem: SVGTransform, index: Int): SVGTransform\n   fun removeItem(index: Int): SVGTransform\n   fun appendItem(newItem: SVGTransform): SVGTransform\n   fun createSVGTransformFromMatrix(matrix: DOMMatrixReadOnly): SVGTransform\n   fun consolidate(): SVGTransform?\n}\n@kotlin.internal.InlineOnly inline operator fun SVGTransformList.get(index: Int): SVGTransform? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGTransformList.set(index: Int, newItem: SVGTransform): Unit { asDynamic()[index] = newItem; }\n\n/**\n * Exposes the JavaScript [SVGAnimatedTransformList](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedTransformList) to Kotlin\n */\npublic external abstract class SVGAnimatedTransformList {\n   open val baseVal: SVGTransformList\n   open val animVal: SVGTransformList\n}\n\n\n/**\n * Exposes the JavaScript [SVGPreserveAspectRatio](https://developer.mozilla.org/en/docs/Web/API/SVGPreserveAspectRatio) to Kotlin\n */\npublic external abstract class SVGPreserveAspectRatio {\n   open var align: Short\n   open var meetOrSlice: Short\n\n   companion object {\n   val SVG_PRESERVEASPECTRATIO_UNKNOWN: Short\n   val

SVG_PRESERVEASPECTRATIO_NONE: Short\n   val SVG_PRESERVEASPECTRATIO_XMINYMIN: Short\n   val SVG_PRESERVEASPECTRATIO_XMIDYMIN: Short\n   val SVG_PRESERVEASPECTRATIO_XMAXYMIN: Short\n   val SVG_PRESERVEASPECTRATIO_XMINYMID: Short\n   val SVG_PRESERVEASPECTRATIO_XMIDYMID: Short\n   val SVG_PRESERVEASPECTRATIO_XMAXYMID: Short\n   val SVG_PRESERVEASPECTRATIO_XMINYMAX: Short\n   val SVG_PRESERVEASPECTRATIO_XMIDYMAX: Short\n   val SVG_PRESERVEASPECTRATIO_XMAXYMAX: Short\n   val SVG_MEETORSLICE_UNKNOWN: Short\n   val SVG_MEETORSLICE_MEET: Short\n   val SVG_MEETORSLICE_SLICE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedPreserveAspectRatio](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedPreserveAspectRatio) to Kotlin\n */\npublic external abstract class SVGAnimatedPreserveAspectRatio {\n   open val baseVal: SVGPreserveAspectRatio\n   open val animVal: SVGPreserveAspectRatio\n}\n\n/**\n * Exposes the JavaScript [SVGPathElement](https://developer.mozilla.org/en/docs/Web/API/SVGPathElement) to Kotlin\n */\npublic external abstract class SVGPathElement : SVGGeometryElement {\n}\n\n/**\n * Exposes the JavaScript [SVGRectElement](https://developer.mozilla.org/en/docs/Web/API/SVGRectElement) to Kotlin\n */\npublic external abstract class SVGRectElement : SVGGeometryElement {\n   open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n   open val height: SVGAnimatedLength\n   open val rx: SVGAnimatedLength\n   open val ry: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript [SVGCircleElement](https://developer.mozilla.org/en/docs/Web/API/SVGCircleElement) to Kotlin\n */\npublic external abstract class SVGCircleElement : SVGGeometryElement {\n   open val cx: SVGAnimatedLength\n   open val cy: SVGAnimatedLength\n   open val r: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript [SVGEllipseElement](https://developer.mozilla.org/en/docs/Web/API/SVGEllipseElement) to Kotlin\n */\npublic external abstract class SVGEllipseElement : SVGGeometryElement {\n   open val cx: SVGAnimatedLength\n   open val cy: SVGAnimatedLength\n   open val rx: SVGAnimatedLength\n   open val ry: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript [SVGLineElement](https://developer.mozilla.org/en/docs/Web/API/SVGLineElement) to Kotlin\n */\npublic external abstract class SVGLineElement : SVGGeometryElement {\n   open val x1: SVGAnimatedLength\n   open val y1: SVGAnimatedLength\n   open val x2: SVGAnimatedLength\n   open val y2: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript [SVGMeshElement](https://developer.mozilla.org/en/docs/Web/API/SVGMeshElement) to Kotlin\n */\npublic external abstract class SVGMeshElement : SVGGeometryElement, SVGURIReference {\n}\n\n/**\n * Exposes the JavaScript [SVGAnimatedPoints](https://developer.mozilla.org/en/docs/Web/API/SVGAnimatedPoints) to Kotlin\n */\npublic external interface SVGAnimatedPoints {\n   val points: SVGPointList\n   val animatedPoints: SVGPointList\n}\n\npublic external abstract class SVGPointList {\n   open val length: Int\n   open val numberOfItems: Int\n   fun clear(): Unit\n   fun initialize(newItem: DOMPoint): DOMPoint\n   fun getItem(index: Int): DOMPoint\n   fun insertItemBefore(newItem: DOMPoint, index: Int): DOMPoint\n   fun replaceItem(newItem: DOMPoint, index: Int): DOMPoint\n   fun removeItem(index: Int): DOMPoint\n   fun appendItem(newItem: DOMPoint): DOMPoint\n}\n@kotlin.internal.InlineOnly inline operator fun SVGPointList.get(index: Int): DOMPoint? = asDynamic()[index]\n@kotlin.internal.InlineOnly inline operator fun SVGPointList.set(index: Int, newItem: DOMPoint): Unit { asDynamic()[index] = newItem; }\n\n/**\n * Exposes the JavaScript [SVGPolylineElement](https://developer.mozilla.org/en/docs/Web/API/SVGPolylineElement) to Kotlin\n */\npublic external abstract class SVGPolylineElement : SVGGeometryElement, SVGAnimatedPoints {\n}\n\n/**\n * Exposes the JavaScript [SVGPolygonElement](https://developer.mozilla.org/en/docs/Web/API/SVGPolygonElement) to Kotlin\n */\npublic external abstract class SVGPolygonElement : SVGGeometryElement, SVGAnimatedPoints {\n}\n\n/**\n * Exposes the JavaScript

[SVGTextContentElement](https://developer.mozilla.org/en/docs/Web/API/SVGTextContentElement) to Kotlin\n */\npublic external abstract class SVGTextContentElement : SVGGraphicsElement {\n   open val textLength: SVGAnimatedLength\n   open val lengthAdjust: SVGAnimatedEnumeration\n   fun getNumberOfChars(): Int\n   fun getComputedTextLength(): Float\n   fun getSubStringLength(charnum: Int, nchars: Int): Float\n   fun getStartPositionOfChar(charnum: Int): DOMPoint\n   fun getEndPositionOfChar(charnum: Int): DOMPoint\n   fun getExtentOfChar(charnum: Int): DOMRect\n   fun getRotationOfChar(charnum: Int): Float\n   fun getCharNumAtPosition(point: DOMPoint): Int\n   fun selectSubString(charnum: Int, nchars: Int): Unit\n\n   companion object {\n   val LENGTHADJUST_UNKNOWN: Short\n   val LENGTHADJUST_SPACING: Short\n   val LENGTHADJUST_SPACINGANDGLYPHS: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGTextPositioningElement](https://developer.mozilla.org/en/docs/Web/API/SVGTextPositioningElement) to Kotlin\n */\npublic external abstract class SVGTextPositioningElement : SVGTextContentElement {\n   open val x: SVGAnimatedLengthList\n   open val y: SVGAnimatedLengthList\n   open val dx: SVGAnimatedLengthList\n   open val dy: SVGAnimatedLengthList\n   open val rotate: SVGAnimatedNumberList\n}\n\n/**\n * Exposes the JavaScript [SVGTextElement](https://developer.mozilla.org/en/docs/Web/API/SVGTextElement) to Kotlin\n */\npublic external abstract class SVGTextElement : SVGTextPositioningElement {\n}\n\n/**\n * Exposes the JavaScript [SVGTSpanElement](https://developer.mozilla.org/en/docs/Web/API/SVGTSpanElement) to Kotlin\n */\npublic external abstract class SVGTSpanElement : SVGTextPositioningElement {\n}\n\npublic external abstract class SVGTextPathElement : SVGTextContentElement, SVGURIReference {\n   open val startOffset: SVGAnimatedLength\n   open val method: SVGAnimatedEnumeration\n   open val spacing: SVGAnimatedEnumeration\n\n   companion object {\n   val TEXTPATH_METHODTYPE_UNKNOWN: Short\n   val TEXTPATH_METHODTYPE_ALIGN: Short\n   val TEXTPATH_METHODTYPE_STRETCH: Short\n   val TEXTPATH_SPACINGTYPE_UNKNOWN: Short\n   val TEXTPATH_SPACINGTYPE_AUTO: Short\n   val TEXTPATH_SPACINGTYPE_EXACT: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [SVGImageElement](https://developer.mozilla.org/en/docs/Web/API/SVGImageElement) to Kotlin\n */\npublic external abstract class SVGImageElement : SVGGraphicsElement, SVGURIReference, HTMLOrSVGImageElement {\n   open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n   open val height: SVGAnimatedLength\n   open val preserveAspectRatio: SVGAnimatedPreserveAspectRatio\n   open var crossOrigin: String?\n}\n\n/**\n * Exposes the JavaScript [SVGForeignObjectElement](https://developer.mozilla.org/en/docs/Web/API/SVGForeignObjectElement) to Kotlin\n */\npublic external abstract class SVGForeignObjectElement : SVGGraphicsElement {\n   open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n   open val height: SVGAnimatedLength\n}\n\npublic external abstract class SVGMarkerElement : SVGElement, SVGFitToViewBox {\n   open val refX: SVGAnimatedLength\n   open val refY: SVGAnimatedLength\n   open val markerUnits: SVGAnimatedEnumeration\n   open val markerWidth: SVGAnimatedLength\n   open val markerHeight: SVGAnimatedLength\n   open val orientType: SVGAnimatedEnumeration\n   open val orientAngle: SVGAnimatedAngle\n   open var orient: String\n   fun setOrientToAuto(): Unit\n   fun setOrientToAngle(angle: SVGAngle): Unit\n\n   companion object {\n   val SVG_MARKERUNITS_UNKNOWN: Short\n   val SVG_MARKERUNITS_USERSPACEONUSE: Short\n   val SVG_MARKERUNITS_STROKEWIDTH: Short\n   val SVG_MARKER_ORIENT_UNKNOWN: Short\n   val SVG_MARKER_ORIENT_AUTO: Short\n   val SVG_MARKER_ORIENT_ANGLE: Short\n   }\n}\n\npublic external abstract class SVGSolidcolorElement : SVGElement {\n}\n\n/**\n * Exposes the JavaScript [SVGGradientElement](https://developer.mozilla.org/en/docs/Web/API/SVGGradientElement) to Kotlin\n */\npublic external abstract class SVGGradientElement : SVGElement, SVGURIReference, SVGUnitTypes {\n   open val gradientUnits: SVGAnimatedEnumeration\n   open val gradientTransform: SVGAnimatedTransformList\n   open val spreadMethod: SVGAnimatedEnumeration\n\n   companion object {\n   val SVG_SPREADMETHOD_UNKNOWN: Short\n   val SVG_SPREADMETHOD_PAD: Short\n   val SVG_SPREADMETHOD_REFLECT: Short\n   val SVG_SPREADMETHOD_REPEAT: Short\n   val

SVG_UNIT_TYPE_UNKNOWN: Short\n   val SVG_UNIT_TYPE_USERSPACEONUSE: Short\n   val
SVG_UNIT_TYPE_OBJECTBOUNDINGBOX: Short\n   }\n}\n\n/**\n * Exposes the JavaScript
[SVGLinearGradientElement](https://developer.mozilla.org/en/docs/Web/API/SVGLinearGradientElement) to
Kotlin\n */\npublic external abstract class SVGLinearGradientElement : SVGGradientElement {\n   open val x1:
SVGAnimatedLength\n   open val y1: SVGAnimatedLength\n   open val x2: SVGAnimatedLength\n   open val
y2: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript
[SVGRadialGradientElement](https://developer.mozilla.org/en/docs/Web/API/SVGRadialGradientElement) to
Kotlin\n */\npublic external abstract class SVGRadialGradientElement : SVGGradientElement {\n   open val cx:
SVGAnimatedLength\n   open val cy: SVGAnimatedLength\n   open val r: SVGAnimatedLength\n   open val fx:
SVGAnimatedLength\n   open val fy: SVGAnimatedLength\n   open val fr: SVGAnimatedLength\n}\n\npublic
external abstract class SVGMeshGradientElement : SVGGradientElement {\n}\n\npublic external abstract class
SVGMeshrowElement : SVGElement {\n}\n\npublic external abstract class SVGMeshpatchElement : SVGElement
{\n}\n\n/**\n * Exposes the JavaScript
[SVGStopElement](https://developer.mozilla.org/en/docs/Web/API/SVGStopElement) to Kotlin\n */\npublic
external abstract class SVGStopElement : SVGElement {\n   open val offset: SVGAnimatedNumber\n}\n\n/**\n *
Exposes the JavaScript [SVGPatternElement](https://developer.mozilla.org/en/docs/Web/API/SVGPatternElement)
to Kotlin\n */\npublic external abstract class SVGPatternElement : SVGElement, SVGFitToViewBox,
SVGURIReference, SVGUnitTypes {\n   open val patternUnits: SVGAnimatedEnumeration\n   open val
patternContentUnits: SVGAnimatedEnumeration\n   open val patternTransform: SVGAnimatedTransformList\n
open val x: SVGAnimatedLength\n   open val y: SVGAnimatedLength\n   open val width: SVGAnimatedLength\n
 open val height: SVGAnimatedLength\n\n   companion object {\n   val SVG_UNIT_TYPE_UNKNOWN:
Short\n   val SVG_UNIT_TYPE_USERSPACEONUSE: Short\n   val
SVG_UNIT_TYPE_OBJECTBOUNDINGBOX: Short\n   }\n}\n\npublic external abstract class SVGHatchElement
: SVGElement {\n}\n\npublic external abstract class SVGHatchpathElement : SVGElement {\n}\n\n/**\n * Exposes
the JavaScript [SVGCursorElement](https://developer.mozilla.org/en/docs/Web/API/SVGCursorElement) to
Kotlin\n */\npublic external abstract class SVGCursorElement : SVGElement, SVGURIReference {\n   open val x:
SVGAnimatedLength\n   open val y: SVGAnimatedLength\n}\n\n/**\n * Exposes the JavaScript
[SVGScriptElement](https://developer.mozilla.org/en/docs/Web/API/SVGScriptElement) to Kotlin\n */\npublic
external abstract class SVGScriptElement : SVGElement, SVGURIReference, HTMLOrSVGScriptElement {\n
open var type: String\n   open var crossOrigin: String?\n}\n\n/**\n * Exposes the JavaScript
[SVGAElement](https://developer.mozilla.org/en/docs/Web/API/SVGAElement) to Kotlin\n */\npublic external
abstract class SVGAElement : SVGGraphicsElement, SVGURIReference {\n   open val target:
SVGAnimatedString\n   open val download: SVGAnimatedString\n   open val rel: SVGAnimatedString\n   open
val relList: SVGAnimatedString\n   open val hreflang: SVGAnimatedString\n   open val type:
SVGAnimatedString\n}\n\n/**\n * Exposes the JavaScript
[SVGViewElement](https://developer.mozilla.org/en/docs/Web/API/SVGViewElement) to Kotlin\n */\npublic
external abstract class SVGViewElement : SVGElement, SVGFitToViewBox, SVGZoomAndPan {\n\n
companion object {\n   val SVG_ZOOMANDPAN_UNKNOWN: Short\n   val
SVG_ZOOMANDPAN_DISABLE: Short\n   val SVG_ZOOMANDPAN_MAGNIFY: Short\n   }\n}\n\n","/*\n
* Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n
*/\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.files\n\nimport
kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport
org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport
org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport
org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript
[Blob](https://developer.mozilla.org/en/docs/Web/API/Blob) to Kotlin\n */\npublic external open class
Blob(blobParts: Array<dynamic> = definedExternally, options: BlobPropertyBag = definedExternally) {\n   open
val size: Int\n   open val type: String\n   open val isClosed: Boolean\n   fun slice(start: Int = definedExternally,

end: Int = definedExternally, contentType: String = definedExternally): Blob\n   fun close(): Unit\n}\n\npublic external interface BlobPropertyBag {\n   var type: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun BlobPropertyBag(type: String? = \"\"): BlobPropertyBag {\n   val o = js(\"({})\")\n\n   o[\"type\"] = type\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [File](https://developer.mozilla.org/en/docs/Web/API/File) to Kotlin\n */\npublic external open class File(fileBits: Array<dynamic>, fileName: String, options: FilePropertyBag = definedExternally) : Blob {\n   open val name: String\n   open val lastModified: Int\n}\n\npublic external interface FilePropertyBag : BlobPropertyBag {\n   var lastModified: Int?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun FilePropertyBag(lastModified: Int? = null, type: String? = \"\"): FilePropertyBag {\n   val o = js(\"({})\")\n   o[\"lastModified\"] = lastModified\n   o[\"type\"] = type\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [FileList](https://developer.mozilla.org/en/docs/Web/API/FileList) to Kotlin\n */\npublic external abstract class FileList : ItemArrayLike<File> {\n   override val length: Int\n   override fun item(index: Int): File?\n}\n\n@kotlin.internal.InlineOnly inline operator fun FileList.get(index: Int): File? = asDynamic()[index]\n\n/**\n * Exposes the JavaScript [FileReader](https://developer.mozilla.org/en/docs/Web/API/FileReader) to Kotlin\n */\npublic external open class FileReader : EventTarget {\n   open val readyState: Short\n   open val result: dynamic\n   open val error: dynamic\n   var onloadstart: ((Event) -> dynamic)?\n   var onprogress: ((Event) -> dynamic)?\n   var onload: ((Event) -> dynamic)?\n   var onabort: ((Event) -> dynamic)?\n   var onerror: ((Event) -> dynamic)?\n   var onloadend: ((Event) -> dynamic)?\n   fun readAsArrayBuffer(blob: Blob): Unit\n   fun readAsBinaryString(blob: Blob): Unit\n   fun readAsText(blob: Blob, label: String = definedExternally): Unit\n   fun readAsDataURL(blob: Blob): Unit\n   fun abort(): Unit\n\n   companion object {\n   val EMPTY: Short\n   val LOADING: Short\n   val DONE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [FileReaderSync](https://developer.mozilla.org/en/docs/Web/API/FileReaderSync) to Kotlin\n */\npublic external open class FileReaderSync {\n   fun readAsArrayBuffer(blob: Blob): ArrayBuffer\n   fun readAsBinaryString(blob: Blob): String\n   fun readAsText(blob: Blob, label: String = definedExternally): String\n   fun readAsDataURL(blob: Blob): String\n}\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.notifications\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [Notification](https://developer.mozilla.org/en/docs/Web/API/Notification) to Kotlin\n */\npublic external open class Notification(title: String, options: NotificationOptions = definedExternally) : EventTarget {\n   var onclick: ((Event) -> dynamic)?\n   var onerror: ((Event) -> dynamic)?\n   open val title: String\n   open val dir: NotificationDirection\n   open val lang: String\n   open val body: String\n   open val tag: String\n   open val image: String\n   open val icon: String\n   open val badge: String\n   open val sound: String\n   open val vibrate: Array<out Int>\n   open val timestamp: Number\n   open val renotify: Boolean\n   open val silent: Boolean\n   open val noscreen: Boolean\n   open val requireInteraction: Boolean\n   open val sticky: Boolean\n   open val data: Any?\n   open val actions: Array<out NotificationAction>\n   fun close(): Unit\n\n   companion object {\n   var permission: NotificationPermission\n   var maxActions: Int\n   fun requestPermission(deprecatedCallback: (NotificationPermission) -> Unit = definedExternally): Promise<NotificationPermission>\n   }\n}\n\npublic external interface NotificationOptions {\n   var dir: NotificationDirection? /* = NotificationDirection.AUTO */\n   get() = definedExternally\n   set(value) = definedExternally\n   var lang: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var body: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var tag: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n   var image: String?\n   get() = definedExternally\n

set(value) = definedExternally\n   var icon: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var badge: String?\n   get() = definedExternally\n   set(value) = definedExternally\n var sound: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var vibrate: dynamic\n   get() = definedExternally\n   set(value) = definedExternally\n   var timestamp: Number?\n   get() = definedExternally\n   set(value) = definedExternally\n   var renotify: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var silent: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var noscreen: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var requireInteraction: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var sticky: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var data: Any? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var actions: Array<NotificationAction>? /* = arrayOf() */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun NotificationOptions(dir: NotificationDirection? = NotificationDirection.AUTO, lang: String? = \"\", body: String? = \"\", tag: String? = \"\", image: String? = null, icon: String? = null, badge: String? = null, sound: String? = null, vibrate: dynamic = null, timestamp: Number? = null, renotify: Boolean? = false, silent: Boolean? = false, noscreen: Boolean? = false, requireInteraction: Boolean? = false, sticky: Boolean? = false, data: Any? = null, actions: Array<NotificationAction>? = arrayOf()): NotificationOptions {\n   val o = js(\"({})\")\n\n   o[\"dir\"] = dir\n   o[\"lang\"] = lang\n   o[\"body\"] = body\n   o[\"tag\"] = tag\n   o[\"image\"] = image\n   o[\"icon\"] = icon\n   o[\"badge\"] = badge\n   o[\"sound\"] = sound\n   o[\"vibrate\"] = vibrate\n   o[\"timestamp\"] = timestamp\n   o[\"renotify\"] = renotify\n   o[\"silent\"] = silent\n   o[\"noscreen\"] = noscreen\n   o[\"requireInteraction\"] = requireInteraction\n   o[\"sticky\"] = sticky\n   o[\"data\"] = data\n   o[\"actions\"] = actions\n\n   return o\n}\n\npublic external interface NotificationAction {\n   var action: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var title: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var icon: String?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun NotificationAction(action: String?, title: String?, icon: String? = null): NotificationAction {\n   val o = js(\"({})\")\n\n   o[\"action\"] = action\n   o[\"title\"] = title\n   o[\"icon\"] = icon\n\n   return o\n}\n\npublic external interface GetNotificationOptions {\n   var tag: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun GetNotificationOptions(tag: String? = \"\"): GetNotificationOptions {\n   val o = js(\"({})\")\n\n   o[\"tag\"] = tag\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [NotificationEvent](https://developer.mozilla.org/en/docs/Web/API/NotificationEvent) to Kotlin\n */\npublic external open class NotificationEvent(type: String, eventInitDict: NotificationEventInit) : ExtendableEvent {\n   open val notification: Notification\n   open val action: String\n}\n\npublic external interface NotificationEventInit : ExtendableEventInit {\n   var notification: Notification?\n   get() = definedExternally\n   set(value) = definedExternally\n   var action: String? /* = \"\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun NotificationEventInit(notification: Notification?, action: String? = \"\", bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): NotificationEventInit {\n   val o = js(\"({})\")\n\n   o[\"notification\"] = notification\n   o[\"action\"] = action\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/* please, don't implement this interface! */\npublic external interface NotificationPermission {\n   companion object\n}\npublic inline val NotificationPermission.Companion.DEFAULT: NotificationPermission get() = \"default\".asDynamic().unsafeCast<NotificationPermission>()\npublic inline val NotificationPermission.Companion.DENIED: NotificationPermission get() = \"denied\".asDynamic().unsafeCast<NotificationPermission>()\npublic inline val NotificationPermission.Companion.GRANTED: NotificationPermission get() = \"granted\".asDynamic().unsafeCast<NotificationPermission>()\n\n/* please, don't implement this interface! */\npublic external interface NotificationDirection {\n   companion object\n}\npublic inline val NotificationDirection.Companion.AUTO: NotificationDirection get() =

\"auto\".asDynamic().unsafeCast<NotificationDirection>()\npublic inline val NotificationDirection.Companion.LTR: NotificationDirection get() = \"ltr\".asDynamic().unsafeCast<NotificationDirection>()\npublic inline val NotificationDirection.Companion.RTL: NotificationDirection get() = \"rtl\".asDynamic().unsafeCast<NotificationDirection>()\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.workers\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.xhr.*\n\n/**\n * Exposes the JavaScript [ServiceWorkerRegistration](https://developer.mozilla.org/en/docs/Web/API/ServiceWorkerRegistration) to Kotlin\n */\npublic external abstract class ServiceWorkerRegistration : EventTarget {\n   open val installing: ServiceWorker?\n   open val waiting: ServiceWorker?\n   open val active: ServiceWorker?\n   open val scope: String\n   open var onupdatefound: ((Event) -> dynamic)?\n   open val APISpace: dynamic\n   fun update(): Promise<Unit>\n   fun unregister(): Promise<Boolean>\n   fun methodName(): Promise<dynamic>\n   fun showNotification(title: String, options: NotificationOptions = definedExternally): Promise<Unit>\n   fun getNotifications(filter: GetNotificationOptions = definedExternally): Promise<dynamic>\n}\n\n/**\n * Exposes the JavaScript [ServiceWorkerGlobalScope](https://developer.mozilla.org/en/docs/Web/API/ServiceWorkerGlobalScope) to Kotlin\n */\npublic external abstract class ServiceWorkerGlobalScope : WorkerGlobalScope {\n   open val clients: Clients\n   open val registration: ServiceWorkerRegistration\n   open var oninstall: ((Event) -> dynamic)?\n   open var onactivate: ((Event) -> dynamic)?\n   open var onfetch: ((Event) -> dynamic)?\n   open var onforeignfetch: ((Event) -> dynamic)?\n   open var onmessage: ((Event) -> dynamic)?\n   open var onfunctionalevent: ((Event) -> dynamic)?\n   open var onnotificationclick: ((Event) -> dynamic)?\n   open var onnotificationclose: ((Event) -> dynamic)?\n   fun skipWaiting(): Promise<Unit>\n}\n\n/**\n * Exposes the JavaScript [ServiceWorker](https://developer.mozilla.org/en/docs/Web/API/ServiceWorker) to Kotlin\n */\npublic external abstract class ServiceWorker : EventTarget, AbstractWorker, UnionMessagePortOrServiceWorker, UnionClientOrMessagePortOrServiceWorker {\n   open val scriptURL: String\n   open val state: ServiceWorkerState\n   open var onstatechange: ((Event) -> dynamic)?\n   fun postMessage(message: Any?, transfer: Array<dynamic> = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [ServiceWorkerContainer](https://developer.mozilla.org/en/docs/Web/API/ServiceWorkerContainer) to Kotlin\n */\npublic external abstract class ServiceWorkerContainer : EventTarget {\n   open val controller: ServiceWorker?\n   open val ready: Promise<ServiceWorkerRegistration>\n   open var oncontrollerchange: ((Event) -> dynamic)?\n   open var onmessage: ((Event) -> dynamic)?\n   fun register(scriptURL: String, options: RegistrationOptions = definedExternally): Promise<ServiceWorkerRegistration>\n   fun getRegistration(clientURL: String = definedExternally): Promise<Any?>\n   fun getRegistrations(): Promise<dynamic>\n   fun startMessages(): Unit\n}\n\npublic external interface RegistrationOptions {\n   var scope: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var type: WorkerType? /* = WorkerType.CLASSIC */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun RegistrationOptions(scope: String? = null, type: WorkerType? = WorkerType.CLASSIC): RegistrationOptions {\n   val o = js(\"({})\")\n\n   o[\"scope\"] = scope\n   o[\"type\"] = type\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [ServiceWorkerMessageEvent](https://developer.mozilla.org/en/docs/Web/API/ServiceWorkerMessageEvent) to Kotlin\n */\npublic external open class ServiceWorkerMessageEvent(type: String, eventInitDict: ServiceWorkerMessageEventInit = definedExternally) : Event {\n   open val data: Any?\n   open val origin: String\n   open val lastEventId: String\n   open val source: UnionMessagePortOrServiceWorker?\n   open val ports: Array<out MessagePort>?\n}\n\npublic external interface ServiceWorkerMessageEventInit : EventInit {\n   var data: Any?\n   get() = definedExternally\n   set(value) = definedExternally\n   var origin: String?\n

get() = definedExternally\n   set(value) = definedExternally\n   var lastEventId: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var source: UnionMessagePortOrServiceWorker?\n   get() = definedExternally\n   set(value) = definedExternally\n   var ports: Array<MessagePort>?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ServiceWorkerMessageEventInit(data: Any? = null, origin: String? = null, lastEventId: String? = null, source: UnionMessagePortOrServiceWorker? = null, ports: Array<MessagePort>? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): ServiceWorkerMessageEventInit {\n   val o = js(\"({})\")\n\n   o[\"data\"] = data\n   o[\"origin\"] = origin\n   o[\"lastEventId\"] = lastEventId\n   o[\"source\"] = source\n   o[\"ports\"] = ports\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n\n/**\n * Exposes the JavaScript [Client](https://developer.mozilla.org/en/docs/Web/API/Client) to Kotlin\n */\npublic external abstract class Client : UnionClientOrMessagePortOrServiceWorker {\n   open val url: String\n   open val frameType: FrameType\n   open val id: String\n   fun postMessage(message: Any?, transfer: Array<dynamic> = definedExternally): Unit\n}\n\n/**\n * Exposes the JavaScript [WindowClient](https://developer.mozilla.org/en/docs/Web/API/WindowClient) to Kotlin\n */\npublic external abstract class WindowClient : Client {\n   open val visibilityState: dynamic\n   open val focused: Boolean\n   fun focus(): Promise<WindowClient>\n   fun navigate(url: String): Promise<WindowClient>\n}\n\n/**\n * Exposes the JavaScript [Clients](https://developer.mozilla.org/en/docs/Web/API/Clients) to Kotlin\n */\npublic external abstract class Clients {\n   fun get(id: String): Promise<Any?>\n   fun matchAll(options: ClientQueryOptions = definedExternally): Promise<dynamic>\n   fun openWindow(url: String): Promise<WindowClient?>\n   fun claim(): Promise<Unit>\n}\n\npublic external interface ClientQueryOptions {\n   var includeUncontrolled: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var type: ClientType? /* = ClientType.WINDOW */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ClientQueryOptions(includeUncontrolled: Boolean? = false, type: ClientType? = ClientType.WINDOW): ClientQueryOptions {\n   val o = js(\"({})\")\n\n   o[\"includeUncontrolled\"] = includeUncontrolled\n   o[\"type\"] = type\n\n   return o}\n\n\n/**\n * Exposes the JavaScript [ExtendableEvent](https://developer.mozilla.org/en/docs/Web/API/ExtendableEvent) to Kotlin\n */\npublic external open class ExtendableEvent(type: String, eventInitDict: ExtendableEventInit = definedExternally) : Event {\n   fun waitUntil(f: Promise<Any?>): Unit\n}\n\npublic external interface ExtendableEventInit : EventInit {\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ExtendableEventInit(bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): ExtendableEventInit {\n   val o = js(\"({})\")\n\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o}\n\n\n/**\n * Exposes the JavaScript [InstallEvent](https://developer.mozilla.org/en/docs/Web/API/InstallEvent) to Kotlin\n */\npublic external open class InstallEvent(type: String, eventInitDict: ExtendableEventInit = definedExternally) : ExtendableEvent {\n   fun registerForeignFetch(options: ForeignFetchOptions): Unit\n}\n\npublic external interface ForeignFetchOptions {\n   var scopes: Array<String>?\n   get() = definedExternally\n   set(value) = definedExternally\n   var origins: Array<String>?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ForeignFetchOptions(scopes: Array<String>?, origins: Array<String>?): ForeignFetchOptions {\n   val o = js(\"({})\")\n\n   o[\"scopes\"] = scopes\n   o[\"origins\"] = origins\n\n   return o}\n\n\n/**\n * Exposes the JavaScript [FetchEvent](https://developer.mozilla.org/en/docs/Web/API/FetchEvent) to Kotlin\n */\npublic external open class FetchEvent(type: String, eventInitDict: FetchEventInit) : ExtendableEvent {\n   open val request: Request\n   open val clientId: String?\n   open val isReload: Boolean\n   fun respondWith(r: Promise<Response>): Unit\n}\n\npublic external interface FetchEventInit : ExtendableEventInit {\n   var request: Request?\n   get() = definedExternally\n   set(value) = definedExternally\n   var clientId: String? /* = null */\n   get() = definedExternally\n   set(value) = definedExternally\n   var isReload: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun

FetchEventInit(request: Request?, clientId: String? = null, isReload: Boolean? = false, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): FetchEventInit {\n   val o = js(\"({})\")\n\n o[\"request\"] = request\n   o[\"clientId\"] = clientId\n   o[\"isReload\"] = isReload\n   o[\"bubbles\"] = bubbles\n o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\npublic external open class ForeignFetchEvent(type: String, eventInitDict: ForeignFetchEventInit) : ExtendableEvent {\n   open val request: Request\n   open val origin: String\n   fun respondWith(r: Promise<ForeignFetchResponse>): Unit\n}\n\npublic external interface ForeignFetchEventInit : ExtendableEventInit {\n   var request: Request?\n   get() = definedExternally\n   set(value) = definedExternally\n   var origin: String? /* = \"null\" */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ForeignFetchEventInit(request: Request?, origin: String? = \"null\", bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): ForeignFetchEventInit {\n   val o = js(\"({})\")\n\n   o[\"request\"] = request\n   o[\"origin\"] = origin\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n o[\"composed\"] = composed\n\n   return o\n}\n\npublic external interface ForeignFetchResponse {\n   var response: Response?\n   get() = definedExternally\n   set(value) = definedExternally\n   var origin: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var headers: Array<String>?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ForeignFetchResponse(response: Response?, origin: String? = null, headers: Array<String>? = null): ForeignFetchResponse {\n   val o = js(\"({})\")\n\n   o[\"response\"] = response\n   o[\"origin\"] = origin\n o[\"headers\"] = headers\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [ExtendableMessageEvent](https://developer.mozilla.org/en/docs/Web/API/ExtendableMessageEvent) to Kotlin\n */\npublic external open class ExtendableMessageEvent(type: String, eventInitDict: ExtendableMessageEventInit = definedExternally) : ExtendableEvent {\n   open val data: Any?\n   open val origin: String\n   open val lastEventId: String\n   open val source: UnionClientOrMessagePortOrServiceWorker?\n   open val ports: Array<out MessagePort>?\n}\n\npublic external interface ExtendableMessageEventInit : ExtendableEventInit {\n   var data: Any?\n   get() = definedExternally\n   set(value) = definedExternally\n   var origin: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var lastEventId: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var source: UnionClientOrMessagePortOrServiceWorker?\n   get() = definedExternally\n   set(value) = definedExternally\n   var ports: Array<MessagePort>?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ExtendableMessageEventInit(data: Any? = null, origin: String? = null, lastEventId: String? = null, source: UnionClientOrMessagePortOrServiceWorker? = null, ports: Array<MessagePort>? = null, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): ExtendableMessageEventInit {\n   val o = js(\"({})\")\n\n   o[\"data\"] = data\n   o[\"origin\"] = origin\n o[\"lastEventId\"] = lastEventId\n   o[\"source\"] = source\n   o[\"ports\"] = ports\n   o[\"bubbles\"] = bubbles\n o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/**\n * Exposes the JavaScript [Cache](https://developer.mozilla.org/en/docs/Web/API/Cache) to Kotlin\n */\npublic external abstract class Cache {\n   fun match(request: dynamic, options: CacheQueryOptions = definedExternally): Promise<Any?>\n   fun matchAll(request: dynamic = definedExternally, options: CacheQueryOptions = definedExternally): Promise<dynamic>\n   fun add(request: dynamic): Promise<Unit>\n   fun addAll(requests: Array<dynamic>): Promise<Unit>\n   fun put(request: dynamic, response: Response): Promise<Unit>\n   fun delete(request: dynamic, options: CacheQueryOptions = definedExternally): Promise<Boolean>\n   fun keys(request: dynamic = definedExternally, options: CacheQueryOptions = definedExternally): Promise<dynamic>\n}\n\npublic external interface CacheQueryOptions {\n   var ignoreSearch: Boolean? /* = false */\n   get() = definedExternally\n set(value) = definedExternally\n   var ignoreMethod: Boolean? /* = false */\n   get() = definedExternally\n set(value) = definedExternally\n   var ignoreVary: Boolean? /* = false */\n   get() = definedExternally\n set(value) = definedExternally\n   var cacheName: String?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CacheQueryOptions(ignoreSearch: Boolean? = false, ignoreMethod: Boolean? = false, ignoreVary: Boolean? = false, cacheName: String? = null):

CacheQueryOptions {\n   val o = js(\"({})\")\n\n   o[\"ignoreSearch\"] = ignoreSearch\n   o[\"ignoreMethod\"] = ignoreMethod\n   o[\"ignoreVary\"] = ignoreVary\n   o[\"cacheName\"] = cacheName\n\n   return o\n}\n\npublic external interface CacheBatchOperation {\n   var type: String?\n   get() = definedExternally\n   set(value) = definedExternally\n   var request: Request?\n   get() = definedExternally\n   set(value) = definedExternally\n   var response: Response?\n   get() = definedExternally\n   set(value) = definedExternally\n   var options: CacheQueryOptions?\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun CacheBatchOperation(type: String? = null, request: Request? = null, response: Response? = null, options: CacheQueryOptions? = null): CacheBatchOperation {\n   val o = js(\"({})\")\n\n   o[\"type\"] = type\n   o[\"request\"] = request\n   o[\"response\"] = response\n   o[\"options\"] = options\n\n   return o\n}\n\n\n/**\n * Exposes the JavaScript [CacheStorage](https://developer.mozilla.org/en/docs/Web/API/CacheStorage) to Kotlin\n */\npublic external abstract class CacheStorage {\n   fun match(request: dynamic, options: CacheQueryOptions = definedExternally): Promise<Any?>\n   fun has(cacheName: String): Promise<Boolean>\n   fun open(cacheName: String): Promise<Cache>\n   fun delete(cacheName: String): Promise<Boolean>\n   fun keys(): Promise<dynamic>\n}\n\npublic external open class FunctionalEvent : ExtendableEvent {\n}\n\npublic external @marker interface UnionClientOrMessagePortOrServiceWorker {\n}\n\n/* please, don't implement this interface! */\npublic external interface ServiceWorkerState {\n   companion object\n}\npublic inline val ServiceWorkerState.Companion.INSTALLING: ServiceWorkerState get() = \"installing\".asDynamic().unsafeCast<ServiceWorkerState>()\npublic inline val ServiceWorkerState.Companion.INSTALLED: ServiceWorkerState get() = \"installed\".asDynamic().unsafeCast<ServiceWorkerState>()\npublic inline val ServiceWorkerState.Companion.ACTIVATING: ServiceWorkerState get() = \"activating\".asDynamic().unsafeCast<ServiceWorkerState>()\npublic inline val ServiceWorkerState.Companion.ACTIVATED: ServiceWorkerState get() = \"activated\".asDynamic().unsafeCast<ServiceWorkerState>()\npublic inline val ServiceWorkerState.Companion.REDUNDANT: ServiceWorkerState get() = \"redundant\".asDynamic().unsafeCast<ServiceWorkerState>()\n\n/* please, don't implement this interface! */\npublic external interface FrameType {\n   companion object\n}\npublic inline val FrameType.Companion.AUXILIARY: FrameType get() = \"auxiliary\".asDynamic().unsafeCast<FrameType>()\npublic inline val FrameType.Companion.TOP_LEVEL: FrameType get() = \"top-level\".asDynamic().unsafeCast<FrameType>()\npublic inline val FrameType.Companion.NESTED: FrameType get() = \"nested\".asDynamic().unsafeCast<FrameType>()\npublic inline val FrameType.Companion.NONE: FrameType get() = \"none\".asDynamic().unsafeCast<FrameType>()\n\n/* please, don't implement this interface! */\npublic external interface ClientType {\n   companion object\n}\npublic inline val ClientType.Companion.WINDOW: ClientType get() = \"window\".asDynamic().unsafeCast<ClientType>()\npublic inline val ClientType.Companion.WORKER: ClientType get() = \"worker\".asDynamic().unsafeCast<ClientType>()\npublic inline val ClientType.Companion.SHAREDWORKER: ClientType get() = \"sharedworker\".asDynamic().unsafeCast<ClientType>()\npublic inline val ClientType.Companion.ALL: ClientType get() = \"all\".asDynamic().unsafeCast<ClientType>()\n\n","/*\n * Generated file\n * DO NOT EDIT\n * \n * See libraries/tools/idl2k for details\n */\n\n@file:Suppress(\"NESTED_CLASS_IN_EXTERNAL_INTERFACE\")\npackage org.w3c.xhr\n\nimport kotlin.js.*\nimport org.khronos.webgl.*\nimport org.w3c.dom.*\nimport org.w3c.dom.css.*\nimport org.w3c.dom.events.*\nimport org.w3c.dom.parsing.*\nimport org.w3c.dom.svg.*\nimport org.w3c.dom.url.*\nimport org.w3c.fetch.*\nimport org.w3c.files.*\nimport org.w3c.notifications.*\nimport org.w3c.performance.*\nimport org.w3c.workers.*\n\n/**\n * Exposes the JavaScript [XMLHttpRequestEventTarget](https://developer.mozilla.org/en/docs/Web/API/XMLHttpRequestEventTarget) to Kotlin\n */\npublic external abstract class XMLHttpRequestEventTarget : EventTarget {\n   open var onloadstart:

((Event) -> dynamic)?\n   open var onprogress: ((Event) -> dynamic)?\n   open var onabort: ((Event) -> dynamic)?\n   open var onerror: ((Event) -> dynamic)?\n   open var onload: ((Event) -> dynamic)?\n   open var ontimeout: ((Event) -> dynamic)?\n   open var onloadend: ((Event) -> dynamic)?\n}\n\n\npublic external abstract class XMLHttpRequestUpload : XMLHttpRequestEventTarget {\n}\n\n\n/**\n * Exposes the JavaScript [XMLHttpRequest](https://developer.mozilla.org/en/docs/Web/API/XMLHttpRequest) to Kotlin\n */\npublic external open class XMLHttpRequest : XMLHttpRequestEventTarget {\n   var onreadystatechange: ((Event) -> dynamic)?\n   open val readyState: Short\n   var timeout: Int\n   var withCredentials: Boolean\n   open val upload: XMLHttpRequestUpload\n   open val responseURL: String\n   open val status: Short\n   open val statusText: String\n   var responseType: XMLHttpRequestResponseType\n   open val response: Any?\n   open val responseText: String\n   open val responseXML: Document?\n   fun open(method: String, url: String): Unit\n   fun open(method: String, url: String, async: Boolean, username: String? = definedExternally, password: String? = definedExternally): Unit\n   fun setRequestHeader(name: String, value: String): Unit\n   fun send(body: dynamic = definedExternally): Unit\n   fun abort(): Unit\n   fun getResponseHeader(name: String): String?\n   fun getAllResponseHeaders(): String\n   fun overrideMimeType(mime: String): Unit\n\n   companion object {\n   val UNSENT: Short\n   val OPENED: Short\n   val HEADERS_RECEIVED: Short\n   val LOADING: Short\n   val DONE: Short\n   }\n}\n\n/**\n * Exposes the JavaScript [FormData](https://developer.mozilla.org/en/docs/Web/API/FormData) to Kotlin\n */\npublic external open class FormData(form: HTMLFormElement = definedExternally) {\n   fun append(name: String, value: String): Unit\n   fun append(name: String, value: Blob, filename: String = definedExternally): Unit\n   fun delete(name: String): Unit\n   fun get(name: String): dynamic\n   fun getAll(name: String): Array<dynamic>\n   fun has(name: String): Boolean\n   fun set(name: String, value: String): Unit\n   fun set(name: String, value: Blob, filename: String = definedExternally): Unit\n}\n\n\n/**\n * Exposes the JavaScript [ProgressEvent](https://developer.mozilla.org/en/docs/Web/API/ProgressEvent) to Kotlin\n */\npublic external open class ProgressEvent(type: String, eventInitDict: ProgressEventInit = definedExternally) : Event {\n   open val lengthComputable: Boolean\n   open val loaded: Int\n   open val total: Int\n}\n\npublic external interface ProgressEventInit : EventInit {\n   var lengthComputable: Boolean? /* = false */\n   get() = definedExternally\n   set(value) = definedExternally\n   var loaded: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n   var total: Int? /* = 0 */\n   get() = definedExternally\n   set(value) = definedExternally\n}\n\n@kotlin.internal.InlineOnly\npublic inline fun ProgressEventInit(lengthComputable: Boolean? = false, loaded: Int? = 0, total: Int? = 0, bubbles: Boolean? = false, cancelable: Boolean? = false, composed: Boolean? = false): ProgressEventInit {\n   val o = js(\"({})\")\n\n   o[\"lengthComputable\"] = lengthComputable\n   o[\"loaded\"] = loaded\n   o[\"total\"] = total\n   o[\"bubbles\"] = bubbles\n   o[\"cancelable\"] = cancelable\n   o[\"composed\"] = composed\n\n   return o\n}\n\n/* please, don't implement this interface! */\npublic external interface XMLHttpRequestResponseType {\n   companion object\n}\npublic inline val XMLHttpRequestResponseType.Companion.EMPTY: XMLHttpRequestResponseType get() = \"\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\npublic inline val XMLHttpRequestResponseType.Companion.ARRAYBUFFER: XMLHttpRequestResponseType get() = \"arraybuffer\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\npublic inline val XMLHttpRequestResponseType.Companion.BLOB: XMLHttpRequestResponseType get() = \"blob\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\npublic inline val XMLHttpRequestResponseType.Companion.DOCUMENT: XMLHttpRequestResponseType get() = \"document\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\npublic inline val XMLHttpRequestResponseType.Companion.JSON: XMLHttpRequestResponseType get() = \"json\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\npublic inline val XMLHttpRequestResponseType.Companion.TEXT: XMLHttpRequestResponseType get() = \"text\".asDynamic().unsafeCast<XMLHttpRequestResponseType>()\n\n",null],"names":[],"mappings":"AAWC,0B;EAVG,IAAI,OAAO,MAAO,KAAI,UAAW,IAAG,MAAM,IAA1C,C;IACI,MAAM,CAAC,QAAD,EAAW,CAAC,SAAD,CAAX,EAAwB,OAAAxB,C;;QAEL,IAAI,OAAO,OAAQ,KAAI,QAAvB,C;IACD,OAAO,CAAC,MAAM,Q

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5F,+C;QAAA,+C;;MAAA,wC;IAAA,C;;;MAsDA,uC;MAhCI,IAAI,gBAAJ,C;QAAgb,MAAa,gCAAyB,uBAAz
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B;MAAA,uB;IAAA,C;;MAAA,0C;MAAA,C;MAII,kE;MAEA,wF;MAEA,oF;MAEA,wE;MAEA,kE;MAEA,oF;M
AEA,sF;MAEA,8E;MAEA,wE;MAEA,sF;MAEA,uF;MAEA,iE;MAEA,6E;MAEA,iE;MAEA,2E;IAhCJ,C;;;MAII,
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;IAAA,C;;;MAEA,6B;MAAA,sC;IAAA,C;;;MAEA,6B;MAAA,+C;IAAA,C;;;MAEA,6B;MAAA,gD;IAAA,C;;;M
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,C;;MAE/B,oB;MACI,eACsB,C;IAF1B,C;;MAIsC,sBAAQ,gB;IAAR,C;;MAInB,gB;MADX,IAAI,CAAC,cAAL,C
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,mB;MAAV,OAAU,cAAV,C;QAAU,mB;QACN,aAAW,MAAK,UAAL,SAAiB,6DAAiB,CAAlC,K;;MAEf,OAA
O,U;IACX,C;;MAMiB,Q;MAHb,IAAI,CAAAE,KAAAF,KAAU,KAAAM,KAApB,C;QAA0B,OAA0B,K;MAEjC
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;C;KAVA,C;;MAgBoD,4BAAU,C;IAAV,C;;MAMG,0BAAS,C;IAAT,C;mFAMvD,yB;MAAA,2C;MAAA,4B;QAIuD,QAA
C,kB;M

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oB,C;QOW,Q;QAAD,OAAuB,aAAtB,2DAAsB,EAAa,KAAb,EAAoB,QAApB,EAA8B,WAA9B,CAA2C,W;M
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AII,IAAI,KAAY,kBAAhB,C;QACI,KAAY,mBAAkB,QAAlB,EAA4C,sCAAhB,QAAgB,EAA5C,C;;;QAGH,QA
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I,IAAI,OuE9CkB,OvE8CT,OAAT,EAAqB,WAArB,CAAJ,C;QAChB,OAAI,aAAJ,GAAmB,KAAM,WAAzB,GA
AyC,I;;;QAGzC,c;;MAJJ,wB;MAMA,kBAAkB,K;MAClB,iBAAiB,W;MACjB,OAAO,S;IACX,C;;MAGyB,U;IA
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B,UAA5B,IAAe,EAAa,CAAmB,C;IAC3C,C;;MAGI,OAAR,IAAI,EAAW,GAAN,K;IACL,C;;MAII,OAAO,M;IA
CX,C;;;MAKA,YAAY,MAAY,IAAK,OAAjB,C;MACZ,sBAAU,IAAV,a;QACI,UAAU,KAAK,CAAL,C;QACV,I
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,C;Q
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FmoLA,OyFnoLkB,CzFmoLlB,EyFnoLqB,KzFmoLrB,CyFnoLwC,QzElDL,YyEkDY,QzElDZ,CyEkDK,EAAsC,o
BzFmoL9E,OyFnoLgG,KzFmoLhG,EyFnoLuG,SzFmoLvG,CyFnoLwC,C;;MAG5D,qC;MACA,OAAO,I;IACX,C;
;MAGI,0BAAW,KAAX,C;MACA,qC;MACA,OAAW,UAAS,qBAAb,GACG,oBAAY,MADf,GAGG,oBAAY,QA
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sF5ER,IsF+EyB,ctF/ErB,QAAJ,C;QAEGI,EwF4BB,cAaJ,0B;QAeGrE,MAAM,6BAAsB,SAAtB,C;QACV,C;;MsF5wBI,cAfqE,0BAepE,CAfsF,yDAenF,SAfiF,C;;MAe3F,OAAO,KAAP,C;IACX,C;;MAII,oBAAa,kB;MACb,YAAO,C;IACX,C;;MAEI,sB;IAAA,C;;M
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+DuDI,KAAK,C/DvDT,CAAJ,C;QACI,c+Dsc,oD;Q/DrDd,MAAM,gCAAyB,OAAQ,WAAjC,C;;c+DsDG,C;aA
CT,C;UAAK,S;UAAL,K;aACA,C;UAAAU,OAAL,SAAK,W;UAAV,K;gBAAEI,aAAa,E;UAACb,IAAI,E/CsJoC,qBA
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1.341 animal-sniffer-annotation 1.17

1.341.1 Available under license :

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jar/org/codehaus/mojo/animal_sniffer/IgnoreJRERequirement.java
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* /opt/ws_local/PERMITS_SQL/1049165745_1591417514.84/0/animal-sniffer-annotations-1-17-sources-1-
jar/META-INF/maven/org.codehaus.mojo/animal-sniffer-annotations/pom.xml

1.342 java-unified-expression-language-api 2.2.7

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* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ArrayELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ValueExpression.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ELException.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/MethodNotFoundException.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ELContextListener.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/MapELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ValueReference.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/BeanELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ExpressionFactory.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/MethodExpression.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ResourceBundleELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/VariableMapper.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ELContextEvent.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/PropertyNotWritableException.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/CompositeELResolver.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/MethodInfo.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/Expression.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ELContext.java

* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-

jar/javax/el/PropertyNotFoundException.java
* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/ListELResolver.java
* /opt/cola/permits/1274701832_1650662465.31/0/juel-api-2-2-7-sources-1-jar/javax/el/FunctionMapper.java

1.343 powermock-core 2.0.0

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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-jar/org/powermock/core/transformers/support/DefaultMockTransformerChain.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-jar/org/powermock/core/classloader/javassist/JavassistMockClassLoader.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-jar/org/powermock/configuration/PowerMockConfiguration.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-jar/org/powermock/core/transformers/javassist/StaticFinalFieldsMockTransformer.java
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-jar/org/powermock/configuration/support/ConfigurationBuilder.java
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-

jar/org/powermock/core/bytebuddy/MethodMaxLocals.java

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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/configuration/GlobalConfiguration.java

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jar/org/powermock/PowerMockInternalException.java

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jar/org/powermock/core/bytebuddy/MaxLocalsExtractor.java

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jar/org/powermock/core/bytebuddy/MockGetawayCall.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/transformers/javassist/PackagePrivateClassesMockTransformer.java
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jar/org/powermock/core/transformers/javassist/JavassistMockTransformerChainFactory.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/transformers/javassist/MethodSizeMockTransformer.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/PrepareForTest.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/ArrayMerger.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/impl/MockPolicyInitializerImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/RunnerTestSuiteChunker.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/MockPolicyInitializer.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/DefaultFieldValueGenerator.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/impl/TestChunkImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/support/AbstractPowerMockTestListenerBase.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/PowerMockListener.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/mockpolicies/impl/MockPolicyInterceptionSettingsImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/testresult/impl/TestMethodResultImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/transformers/TransformStrategy.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/mockpolicies/MockPolicyInterceptionSettings.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-

jar/org/powermock/tests/utils/impl/PowerMockIgnorePackagesExtractorImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/mockpolicies/MockPolicyClassLoadingSettings.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/PrepareOnlyThisForTest.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/PowerMockPolicy.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/PrepareEverythingForTest.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/listener/AnnotationEnablerListener.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/TestChunk.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/PowerMockTestListener.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/testresult/Result.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/MockPolicy.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/impl/PrepareForTestExtractorImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/IndicateReloadClass.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/testresult/TestSuiteResult.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/impl/ArrayMergerImpl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/tests/utils/impl/TestCaseEntry.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/spi/NewInvocationControl.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/PowerMockIgnore.java
* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/classloader/annotations/SuppressStaticInitializationFor.java
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* /opt/cola/permits/1136978735_1613989327.28/0/powermock-core-2-0-0-sources-1-
jar/org/powermock/core/transformers/javassist/support/Primitives.java

1.344 lucene-join 9.3.0

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The class org.apache.lucene.util.compress.LZ4 is a Java rewrite of the LZ4
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The snowball stemmers in
 analysis/common/src/java/net/sf/snowball
were developed by Martin Porter and Richard Boulton.
The snowball stopword lists in
 analysis/common/src/resources/org/apache/lucene/analysis/snowball
were developed by Martin Porter and Richard Boulton.
The full snowball package is available from
 https://snowballstem.org/

The KStem stemmer in
 analysis/common/src/org/apache/lucene/analysis/en
was developed by Bob Krovetz and Sergio Guzman-Lara (CIIR-UMass Amherst)
under the BSD-license.

The Arabic,Persian,Romanian,Bulgarian, Hindi and Bengali analyzers (common) come with a default
stopword list that is BSD-licensed created by Jacques Savoy. These files reside in:
analysis/common/src/resources/org/apache/lucene/analysis/ar/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/fa/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
See http://members.unine.ch/jacques.savoy/clef/index.html.

The German,Spanish,Finnish,French,Hungarian,Italian,Portuguese,Russian and Swedish light stemmers
(common) are based on BSD-licensed reference implementations created by Jacques Savoy and
Ljiljana Dolamic. These files reside in:
analysis/common/src/java/org/apache/lucene/analysis/de/GermanLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

The Stempel analyzer (stempel) includes BSD-licensed software developed
by the Egothor project http://egothor.sf.net/, created by Leo Galambos, Martin Kvapil,
and Edmond Nolan.

The Polish analyzer (stempel) comes with a default
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in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt.
See https://github.com/carrot2/carrot2.

The SmartChineseAnalyzer source code (smartcn) was
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WordBreakTestUnicode_*.java (under modules/analysis/common/src/test/)
is derived from Unicode data such as the Unicode Character Database.
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The Morfologik analyzer (morfologik) includes BSD-licensed software
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(https://github.com/morfologik/morfologik-stemming) and uses
data from the BSD-licensed dictionary of Polish (SGJP, http://sgjp.pl/morfeusz/).

Servlet-api.jar and javax.servlet-*.jar are under the CDDL license, the original
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 http://jaist.dl.sourceforge.net/project/mecab/mecab-ipadic/2.7.0-20070801/mecab-ipadic-2.7.0-20070801.tar.gz

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jar/com/google/gson/stream/MalformedJsonException.java
* /opt/cola/permits/1051803203_1649200902.43/0/gson-2-8-0-sources-jar/com/google/gson/stream/JsonScope.java
* /opt/cola/permits/1051803203_1649200902.43/0/gson-2-8-0-sources-jar/com/google/gson/stream/JsonToken.java
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jar/com/google/gson/internal/bind/TimeTypeAdapter.java
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jar/com/google/gson/internal/ConstructorConstructor.java
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* /opt/cola/permits/1051803203_1649200902.43/0/gson-2-8-0-sources-jar/com/google/gson/annotations/Expose.java

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jar/com/google/gson/internal/bind/ObjectTypeAdapter.java
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*/

/**

* SHA2-based Unix crypt implementation.

* <p>

* Based on the C implementation released into the Public Domain by Ulrich Drepper <drepper@redhat.com>

* http://www.akkadia.org/drepper/SHA-crypt.txt

* <p>

* Conversion to Kotlin and from there to Java in 2012 by Christian Hammers <ch@lathspell.de> and likewise put

* into the Public Domain.

* <p>

* This class is immutable and thread-safe.

*

* @version $Id: Sha2Crypt.java 1619948 2014-08-22 22:53:55Z ggregory $

* @since 1.7

*/

Found in path(s):
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/digest/Sha2Crypt.java
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*/
/**
* The libc crypt() "1" and Apache "$apr1$" MD5-based hash algorithm.
* <p>
* Based on the public domain ("beer-ware") C implementation from Poul-Henning Kamp which was found at: <a
* href="http://www.freebsd.org/cgi/cvsweb.cgi/src/lib/libcrypt/crypt-md5.c?rev=1.1;content-type=text%2Fplain">
* crypt-md5.c @ freebsd.org
* <p>
* Source:
*
* <pre>
* $FreeBSD: src/lib/libcrypt/crypt-md5.c,v 1.1 1999/01/21 13:50:09 brandon Exp $
* </pre>
* <p>
* Conversion to Kotlin and from there to Java in 2012.
* <p>
* The C style comments are from the original C code, the ones with "//" from the port.
* <p>
* This class is immutable and thread-safe.
*
* @version $Id: Md5Crypt.java 1563226 2014-01-31 19:38:06Z ggregory $
* @since 1.7
*/

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-

tar-gz/nikitakraev-apache-common-codec-
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tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/Hex.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/DecoderException.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/bm/RuleType.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/DaitchMokotoffSoundex.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/Caverphone1.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/DoubleMetaphone.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/bm/NameType.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/BinaryEncoder.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/net/BCodec.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-

tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/ColognePhonetic.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/bm/PhoneticEngine.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/net/QCodec.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/Decoder.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/EncoderException.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/binary/Base64OutputStream.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/language/bm/ResourceConstants.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/net/Utils.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/Encoder.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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caa8093/apache/src/main/java/apache/commons/codec/StringDecoder.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
tar-gz/nikitakraev-apache-common-codec-
caa8093/apache/src/main/java/apache/commons/codec/digest/HmacAlgorithms.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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caa8093/apache/src/main/java/apache/commons/codec/digest/UnixCrypt.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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caa8093/apache/src/main/java/apache/commons/codec/binary/BaseNCodecOutputStream.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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caa8093/apache/src/main/java/apache/commons/codec/net/RFC1522Codec.java
* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-
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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/Base64.java

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/net/QuotedPrintableCodec.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-

caa8093/apache/src/main/java/apache/commons/codec/digest/MessageDigestAlgorithms.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/language/Caverphone2.java

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/BinaryCodec.java

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/language/Caverphone.java

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/language/bm/Languages.java

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* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/language/RefinedSoundex.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/CharSequenceUtils.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/language/Metaphone.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/Base32InputStream.java

* /opt/cola/permits/1530515190_1673519223.8258314/0/nikitakraev-apache-common-codec-1-10-0-g84dd72c-1-tar-gz/nikitakraev-apache-common-codec-caa8093/apache/src/main/java/apache/commons/codec/binary/BaseNCodec.java

1.349 hamcrest 2.1

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1.350 dropwizard-configuration-support 1.3.23

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1.351 metrics-integration-for-jersey-2.x 4.0.5

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Manifest-Version: 1.0
Bnd-LastModified: 1545938116383
Build-Jdk: 1.8.0_191
Built-By: artem
Bundle-Description: A set of class providing Metrics integration for J
ersey, the reference JAX-RS   implementation.
Bundle-License: http://www.apache.org/licenses/LICENSE-2.0.html
Bundle-ManifestVersion: 2
Bundle-Name: Metrics Integration for Jersey 2.x
Bundle-SymbolicName: io.dropwizard.metrics.jersey2
Bundle-Version: 4.0.5
Created-By: Apache Maven Bundle Plugin
Export-Package: com.codahale.metrics.jersey2;uses:="com.codahale.metri
cs,javax.ws.rs.core,javax.ws.rs.ext,org.glassfish.jersey.server.model

,org.glassfish.jersey.server.monitoring";version="4.0.5"

Implementation-Title: Metrics Integration for Jersey 2.x

Implementation-URL: http://metrics.dropwizard.io/metrics-jersey2

Implementation-Vendor-Id: io.dropwizard.metrics

Implementation-Version: 4.0.5

Import-Package: com.codahale.metrics;version="[4.0,5)",com.codahale.me

trics.annotation;version="[4.0,5)",javax.ws.rs.core;version="[2.0,3)"

,javax.ws.rs.ext;version="[2.0,3)",org.glassfish.jersey.server;versio

n="[2.25,3)",org.glassfish.jersey.server.model;version="[2.25,3)",org

.glassfish.jersey.server.monitoring;version="[2.25,3)"

Require-Capability: osgi.ee;filter:="(&(osgi.ee=JavaSE)(version=1.8))"

Tool: Bnd-3.3.0.201609221906

Found in path(s):

* /opt/cola/permits/1274704515_1648835830.16/0/metrics-jersey2-4-0-5-jar/META-INF/MANIFEST.MF

1.352 jetty-toolchain 1.0.3

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Found in path(s):

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/RLimit.java

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/Passwd.java

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/SetUIDListener.java

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/Group.java

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/SetUID.java

* /opt/cola/permits/1274699530_1649200708.6/0/jetty-setuid-java-1-0-3-sources-
jar/org/eclipse/jetty/setuid/SetUIDServer.java

1.353 duct-tape 1.0.6

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1.354 slf4j-api-module 1.7.25

1.355 hppc 0.8.1

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* /opt/cola/permits/1125857121_1611466049.52/0/hppc-0-8-1-sources-1-jar/com/carrotsearch/hppc/BitSet.java
* /opt/cola/permits/1125857121_1611466049.52/0/hppc-0-8-1-sources-1-jar/com/carrotsearch/hppc/BitUtil.java
* /opt/cola/permits/1125857121_1611466049.52/0/hppc-0-8-1-sources-1-
jar/com/carrotsearch/hppc/BitSetIterator.java

1.356 java-servlet-api 3.1.0

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1.361 aws-sdk-for-java 1.11.30

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 4. You may copy and distribute the Library (or a portion or
derivative of it, under Section 2) in object code or executable form
under the terms of Sections 1 and 2 above provided that you accompany
it with the complete corresponding machine-readable source code, which
must be distributed under the terms of Sections 1 and 2 above on a
medium customarily used for software interchange.

 If distribution of object code is made by offering access to copy
from a designated place, then offering equivalent access to copy the
source code from the same place satisfies the requirement to
distribute the source code, even though third parties are not
compelled to copy the source along with the object code.

 5. A program that contains no derivative of any portion of the
Library, but is designed to work with the Library by being compiled or
linked with it, is called a "work that uses the Library". Such a
work, in isolation, is not a derivative work of the Library, and
therefore falls outside the scope of this License.

 However, linking a "work that uses the Library" with the Library
creates an executable that is a derivative of the Library (because it
contains portions of the Library), rather than a "work that uses the
library". The executable is therefore covered by this License.
Section 6 states terms for distribution of such executables.

 When a "work that uses the Library" uses material from a header file
that is part of the Library, the object code for the work may be a
derivative work of the Library even though the source code is not.
Whether this is true is especially significant if the work can be
linked without the Library, or if the work is itself a library. The
threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data
structure layouts and accessors, and small macros and small inline
functions (ten lines or less in length), then the use of the object
file is unrestricted, regardless of whether it is legally a derivative
work. (Executables containing this object code plus portions of the
Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may
distribute the object code for the work under the terms of Section 6.
Any executables containing that work also fall under Section 6,
whether or not they are linked directly with the Library itself.
^L
6. As an exception to the Sections above, you may also combine or
link a "work that uses the Library" with the Library to produce a
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modification of the work for the customer's own use and reverse
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directing the user to the copy of this License. Also, you must do one
of these things:

a) Accompany the work with the complete corresponding
machine-readable source code for the Library including whatever
changes were used in the work (which must be distributed under
Sections 1 and 2 above); and, if the work is an executable linked
with the Library, with the complete machine-readable "work that
uses the Library", as object code and/or source code, so that the
user can modify the Library and then relink to produce a modified
executable containing the modified Library. (It is understood
that the user who changes the contents of definitions files in the
Library will not necessarily be able to recompile the application
to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the
Library. A suitable mechanism is one that (1) uses at run time a
copy of the library already present on the user's computer system,
rather than copying library functions into the executable, and (2)
will operate properly with a modified version of the library, if
the user installs one, as long as the modified version is
interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at
least three years, to give the same user the materials
specified in Subsection 6a, above, for a charge no more
than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy
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e) Verify that the user has already received a copy of these
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Library" must include any data and utility programs needed for
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components (compiler, kernel, and so on) of the operating system on
which the executable runs, unless that component itself accompanies
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1.363 fastutil 6.5.7

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see http://sites.google.com/site/rrettesite/moman and
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The class org.apache.lucene.util.WeakIdentityMap was derived from
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The snowball stemmers in
 analysis/common/src/java/net/sf/snowball
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The snowball stopword lists in
 analysis/common/src/resources/org/apache/lucene/analysis/snowball
were developed by Martin Porter and Richard Boulton.
The full snowball package is available from
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The KStem stemmer in
 analysis/common/src/org/apache/lucene/analysis/en
was developed by Bob Krovetz and Sergio Guzman-Lara (CIIR-UMass Amherst)
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The Arabic,Persian,Romanian,Bulgarian, Hindi and Bengali analyzers (common) come with a default stopword list that is BSD-licensed created by Jacques Savoy. These files reside in:
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analysis/common/src/resources/org/apache/lucene/analysis/ro/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bg/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/hi/stopwords.txt,
analysis/common/src/resources/org/apache/lucene/analysis/bn/stopwords.txt
See http://members.unine.ch/jacques.savoy/clef/index.html.

The German,Spanish,Finnish,French,Hungarian,Italian,Portuguese,Russian and Swedish light stemmers (common) are based on BSD-licensed reference implementations created by Jacques Savoy and Ljiljana Dolamic. These files reside in:
analysis/common/src/java/org/apache/lucene/analysis/de/GermanLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fi/FinnishLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java

analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/it/ItalianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/ru/RussianLightStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/sv/SwedishLightStemmer.java

The Stempel analyzer (stempel) includes BSD-licensed software developed
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and Edmond Nolan.

The Polish analyzer (stempel) comes with a default
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in stempel/src/resources/org/apache/lucene/analysis/pl/stopwords.txt.
See https://github.com/carrot2/carrot2.

The SmartChineseAnalyzer source code (smartcn) was
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1.367 jackson-module-afterburner 2.10.2
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1.368 powermock-reflect 2.0.0

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* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/exceptions/FieldNotFoundException.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/matcherstrategies/AssignableFromFieldTypeMatcherStrategy.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/matcherstrategies/FieldAnnotationMatcherStrategy.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/WhiteboxImpl.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/primitivesupport/PrimitiveWrapper.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/matcherstrategies/AllFieldsMatcherStrategy.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/Whitebox.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/exceptions/MethodNotFoundException.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/exceptions/TooManyFieldsFoundException.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-jar/org/powermock/reflect/internal/matcherstrategies/FieldNameMatcherStrategy.java

* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/internal/matcherstrategies/FieldTypeMatcherStrategy.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/exceptions/MethodInvocationException.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/internal/matcherstrategies/FieldMatcherStrategy.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/exceptions/ConstructorNotFoundException.java
* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
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jar/org/powermock/reflect/internal/TypeUtils.java
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jar/org/powermock/reflect/internal/comparator/ComparatorFactory.java

* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/internal/ParameterTypesMatcher.java

* /opt/cola/permits/1354022521_1656537434.8658118/0/powermock-reflect-2-0-0-sources-3-
jar/org/powermock/reflect/internal/CandidateConstructorSearcher.java

1.369 liquibase 3.5.5

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1.372 jackson-dataformats-binary 2.6.6

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1.374 apache-httpcomponents-core 4.4.5

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1.375 swagger-doclet 1.0.5

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jQuery Wiggle
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URL: http://labs.wondergroup.com/demos/mini-ui/index.html
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// MIT License
/**
sprintf() for JavaScript 0.7-beta1
http://www.diveintojavascript.com/projects/javascript-sprintf

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Changelog:
2010.11.07 - 0.7-beta1-node
 - converted it to a node.js compatible module

2010.09.06 - 0.7-beta1
 - features: vsprintf, support for named placeholders
 - enhancements: format cache, reduced global namespace pollution

2010.05.22 - 0.6:
- reverted to 0.4 and fixed the bug regarding the sign of the number 0
Note:
Thanks to Raphael Pigulla <raph (at] n3rd [dot) org> (http://www.n3rd.org/)
who warned me about a bug in 0.5, I discovered that the last update was
a regress. I appologize for that.
```

2010.05.09 - 0.5:
- bug fix: 0 is now preceeded with a + sign
- bug fix: the sign was not at the right position on padded results (Kamal Abdali)
- switched from GPL to BSD license

2007.10.21 - 0.4:
- unit test and patch (David Baird)

2007.09.17 - 0.3:
- bug fix: no longer throws exception on empty paramenters (Hans Pufal)

2007.09.11 - 0.2:
- feature: added argument swapping

2007.04.03 - 0.1:
- initial release
**/

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handlebars v2.0.0

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* https://github.com/chjj/marked
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* jQuery BBQ: Back Button & Query Library - v1.2.1 - 2/17/2010
* http://benalman.com/projects/jquery-bbq-plugin/
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1.376 asm 9.1

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1.377 error_prone_annotations 2.3.4

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*/

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* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/concurrent/UnlockMethod.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/concurrent/LockMethod.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/NoAllocation.java
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* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/RestrictedApi.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/DoNotMock.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/CompatibleWith.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/FormatMethod.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-
jar/com/google/errorprone/annotations/FormatString.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/MustBeClosed.java
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* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/CheckReturnValue.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/concurrent/GuardedBy.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/OverridingMethodsMustInvokeSuper.java
* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/DoNotCall.java
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* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/SuppressPackageLocation.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/ForOverride.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/IncompatibleModifiers.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/concurrent/LazyInit.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/RequiredModifiers.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/Var.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/CanIgnoreReturnValue.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/CompileTimeConstant.java

* /opt/cola/permits/1206718612_1632455182.54/0/error-prone-annotations-2-3-4-sources-9-jar/com/google/errorprone/annotations/Immutable.java

1.378 hk2-implementation-utilities 2.5.0-b03

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INF/maven/org.glassfish.hk2/hk2-utils/pom.xml
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Manifest-Version: 1.0
Export-Package: org.glassfish.hk2.utilities.cache;version="2.5.0",org.
glassfish.hk2.utilities.general;version="2.5.0";uses:="org.glassfish.
hk2.utilities.cache",org.glassfish.hk2.utilities.reflection;version="
2.5.0",org.glassfish.hk2.utilities.reflection.internal;version="2.5.0
";uses:="org.glassfish.hk2.utilities.reflection",org.jvnet.hk2.compon
ent;version="2.5.0",org.jvnet.tiger_types;version="2.5.0"
Built-By: java_re
Tool: Bnd-2.1.0.20130426-122213
Bundle-Name: HK2 Implementation Utilities
Created-By: Apache Maven Bundle Plugin
Bundle-Vendor: Oracle Corporation
Build-Jdk: 1.7.0_75
Bundle-Version: 2.5.0.b03
service: foo
Bnd-LastModified: 1453393971211
Bundle-ManifestVersion: 2
Bundle-License: https://glassfish.java.net/nonav/public/CDDL+GPL_1_1.h
tml
Bundle-Description: HK2 Implementation Utilities
Bundle-SymbolicName: org.glassfish.hk2.utils
Bundle-DocURL: http://www.oracle.com
Import-Package: javax.annotation,javax.inject
Originally-Created-By: Apache Maven

Archiver-Version: Plexus Archiver

Found in path(s):
* /opt/cola/permits/1355542126_1657247676.615752/0/hk2-utils-2-5-0-b03-jar/META-INF/MANIFEST.MF

1.379 jsoup 1.8.1

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1.380 hk2-api-module 2.5.0-b32

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1.382 jackson-dataformat-yaml 2.13.3

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jar/jersey/repackaged/com/google/common/collect/Interners.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/base/Preconditions.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/Multisets.java
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 *
 * As of 2010/06/11, this method is identical to the (package private) hash
 * method in OpenJDK 7's java.util.HashMap class.
 */

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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/io/BaseEncoding.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-

jar/jersey/repackaged/com/google/common/collect/ImmutableRangeSet.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/FilteredKeyMultimap.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/io/GwtWorkarounds.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/CartesianList.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/ImmutableRangeMap.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/FilteredMultimapValues.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/AbstractTable.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/base/Utf8.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/base/Verify.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/GeneralRange.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/primitives/ParseRequest.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/RegularImmutableSortedMultiset.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/ForwardingSortedMultiset.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/primitives/UnsignedInteger.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/primitives/UnsignedInts.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/ImmutableSortedMultiset.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/Count.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/RangeSet.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/primitives/UnsignedLongs.java
* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/ImmutableSortedMultisetFauxverideShim.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-jar/jersey/repackaged/com/google/common/collect/MapMakerInternalMap.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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jar/jersey/repackaged/com/google/common/util/concurrent/TimeLimiter.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/util/concurrent/SimpleTimeLimiter.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/util/concurrent/FakeTimeLimiter.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
jar/jersey/repackaged/com/google/common/collect/WellBehavedMap.java
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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* /opt/cola/permits/1130987488_1615189252.35/0/jersey-guava-2-25-1-sources-
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1.388 argparse 0.8.1

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jar/net/sourceforge/argparse4j/inf/ArgumentType.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/ArgumentParser.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/helper/CJKTextWidthCounter.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/action/HelpArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/helper/PrefixPattern.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/helper/TextWidthCounter.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/internal/UnrecognizedArgumentException.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/annotation/Arg.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/ArgumentParserException.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/action/StoreConstArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/ArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/Arguments.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/ArgumentGroup.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/Subparsers.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/helper/ReflectHelper.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/internal/UnrecognizedCommandException.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/action/StoreArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/inf/Namespace.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/choice/CollectionArgumentChoice.java

* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/ArgumentParsers.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/ArgumentParserImpl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/action/StoreFalseArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/action/AppendConstArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/ArgumentGroupImpl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/inf/Argument.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/inf/ArgumentChoice.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/inf/FeatureControl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/choice/RangeArgumentChoice.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/SubparsersImpl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/SubparserImpl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/inf/Subparser.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/type/StringArgumentType.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/action/AppendArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/helper/ASCIITextWidthCounter.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/type/FileVerification.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/helper/TextHelper.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/type/EnumArgumentType.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/action/StoreTrueArgumentAction.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/type/ConstructorArgumentType.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/ParseState.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/internal/ArgumentImpl.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-jar/net/sourceforge/argparse4j/impl/action/VersionArgumentAction.java
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jar/net/sourceforge/argparse4j/impl/type/CaseInsensitiveEnumStringArgumentType.java
* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
jar/net/sourceforge/argparse4j/impl/type/CaseInsensitiveEnumNameArgumentType.java
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* /opt/cola/permits/1274701436_1645235201.06/0/argparse4j-0-8-1-sources-
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1.389 jackson-datatype-jdk8 2.13.3

1.389.1 Available under license :

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1.390 powermock-module-testng-common 2.0.0

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1.391 asm-analysis 9.2

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/**
 * Constructs a new {@link SourceInterpreter} for the latest ASM API version. <i>Subclasses must
 * not use this constructor</i>. Instead, they must use the {@link #SourceInterpreter(int)}
 * version.
 */

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* /opt/cola/permits/1288694723_1647366364.82/0/asm-analysis-9-2-sources-jar/org/objectweb/asm/tree/analysis/BasicValue.java
* /opt/cola/permits/1288694723_1647366364.82/0/asm-analysis-9-2-sources-jar/org/objectweb/asm/tree/analysis/AnalyzerException.java
* /opt/cola/permits/1288694723_1647366364.82/0/asm-analysis-9-2-sources-jar/org/objectweb/asm/tree/analysis/Subroutine.java
* /opt/cola/permits/1288694723_1647366364.82/0/asm-analysis-9-2-sources-jar/org/objectweb/asm/tree/analysis/Frame.java
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/**

 * Constructs a new {@link BasicInterpreter} for the latest ASM API version. <i>Subclasses must

 * not use this constructor</i>. Instead, they must use the {@link #BasicInterpreter(int)}

 * version.

 */

Found in path(s):

* /opt/cola/permits/1288694723_1647366364.82/0/asm-analysis-9-2-sources-jar/org/objectweb/asm/tree/analysis/BasicInterpreter.java

1.392 asm-tree 9.1

1.392.1 Available under license :

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Manifest-Version: 1.0

Bundle-DocURL: http://asm.ow2.org

Bundle-License: BSD-3-Clause;link=https://asm.ow2.io/LICENSE.txt

Bundle-ManifestVersion: 2

Bundle-Name: org.objectweb.asm.tree

Bundle-RequiredExecutionEnvironment: J2SE-1.5

Bundle-SymbolicName: org.objectweb.asm.tree

Bundle-Version: 9.1.0

Export-Package: org.objectweb.asm.tree;version="9.1";uses:="org.object web.asm"

Implementation-Title: Tree API of ASM, a very small and fast Java byte code manipulation framework

Implementation-Version: 9.1

Import-Package: org.objectweb.asm;version="[9.1,10)"

Module-Requires: org.objectweb.asm;transitive=true

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1.393 caffeine-cache 2.8.1

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/S3RequesterChargedHeaderHandler.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/S3AccelerateUnsupported.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/S3VersionResult.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/GetObjectAclRequest.java
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*/

```
/**
 * Synchronous client for accessing Amazon S3.
 *
 * <h1>Appendix: Amazon S3 client-side encryption meta information</h1>
 *
 * <h2>Introduction</h2>
 * <p>
 * This appendix summarizes the current crypto related meta information
 * associated with an S3 object encrypted using SDK client-side encryption. In
 * SDK's terminology, these meta information are classified as "user metatdata".
 * In general, the meta information is just a map of key/value pairs. Physically
 * they are persisted either as metadata of the encrypted S3 object, or as a
 * separate S3 object called an "instruction file" (which is just a JSON file in
 * plaintext.)  For all references to the Cipher Algorithm Names, Modes, and Padding,
 * such as <code>"AES/CBC/PKCS5Padding"</code>, please refer to Oracle's <a
 * href="http://docs.oracle.com/javase/7/docs/technotes/guides/security/StandardNames.html"
 * >Java&trade; Cryptography Architecture Standard Algorithm Name Documentation</a>
 * for more details.
 *
 * <h2>S3 metadata vs instruction file</h2>
 * <p>
 * Note when a key/value pair is stored as "user metadata" as part of the S3
 * metadata, the SDK always adds an additional prefix of <b>x-amz-meta-</b> to
 * the key name. In contrast, the SDK doesn't add any prefix when the key names
 * are stored in an instruction file. (The reason has to do with how the http
 * headers are handled.)
 *
 * For example, <b>x-amz-key</b> would get stored as <b>x-amz-meta-x-amz-key</b>
 * in S3 metadata. In contrast, <b>x-amz-key</b> would simply be stored as is
 * (ie without the prefix) in an instruction file.
 *
 * All the keys described below are considered "user metadata" by the SDK.
 *
 * <h2>S3 v1 crypto meta information (supported by all SDK's)</h2>
 * <p>
 * For non-KMS client side encryption, this v1 crypto meta information is used
 * to support the "Encryption Only" crypto mode (which involves the use of
 * <code>AES/CBC/PKCS5Padding</code> for content encryption, and
 * <code>AES/ECB</code> for encrypting the one-time randomly generated data
 * key). For KMS client-side encryption, the v2 crypto meta information is used.
 * <p>
 * <table border=1>
 * <tr aligned="left">
 * <th>key</th>
 * <th>description</th>
 * </tr>
 * <tr>
 * <td width="200"><b>x-amz-key</b></td>
```

* <td>Content encrypting key (cek) in encrypted form, base64 encoded. The cek
* is randomly generated per S3 object, and is always an AES 256-bit key. The
* corresponding cipher is always "AES/CBC/PKCS5Padding".</td>
* </tr>
* <tr>
* <td>x-amz-iv</td>
* <td>Randomly generated IV (per S3 object), base64 encoded</td>
* </tr>
* <tr>
* <td>x-amz-matdesc </td>
* <td>Customer provided material description in JSON (UTF8) format. Used to
* identify the client-side master key (ie used to encrypt/wrap the generated
* content encrypting key).</td>
* </tr>
* <tr>
* <td>x-amz-unencrypted-content-length</td>
* <td>Unencrypted content length (optional but should be specified whenever
* possible).</td>
* </tr>
* </table>
*
* <h2>S3 v2 crypto meta information (currently supported by the Java SDK)</h2>
* <p>
* This v2 crypto meta information is used to support both authenticated
* encryption (which involves the use of <code>AES/GCM/NoPadding</code> for
* content encryption, and key wrapping for the one-time randomly generated data
* key), and KMS client-side encryption (which can either be encryption-only or
* authenticated encryption.)
* <p>
* <table border=1>
* <tr aligned="left">
* <th>key</th>
* <th>description</th>
* </tr>
* <tr>
* <td width="200">x-amz-key-v2</td>
* <td>CEK in key wrapped form. This is necessary so that the S3 encryption
* client that doesn't recognize the v2 format will not mistakenly decrypt S3
* object encrypted in v2 format.</td>
* </tr>
* <tr>
* <td>x-amz-iv</td>
* <td>Randomly generated IV (per S3 object), base64 encoded. (Same as v1.)</td>
* </tr>
* <tr>
* <td>x-amz-matdesc</td>
* <td>Customer provided material description in JSON format. (Same as v1). Used
* to identify the client-side master key.

*
* For KMS client side encryption, the KMS Customer Master Key ID is stored
* as part of the material description, x-amz-matdesc, under the key-name
* <code>"kms_cmk_id"</code>.
*
* </td>
* </tr>
* <tr>
* <td>x-amz-unencrypted-content-length</td>
* <td>Unencrypted content length. (optional but should be specified whenever
* possible. Same as v1.)</td>
* </tr>
* <tr>
* <td>x-amz-wrap-alg</td>
* <td>Key wrapping algorithm used.
*
* Supported values:
* <code>"AESWrap", "RSA/ECB/OAEPWithSHA-256AndMGF1Padding", "kms"</code>
* No standard key wrapping is used if this meta information is absent
* Always set to "kms" if KMS is used for client-side encryption
*
* </td>
* </tr>
* <tr>
* <td>x-amz-cek-alg</td>
* <td>Content encryption algorithm used.
*
* Supported values:
* <code>"AES/GCM/NoPadding", "AES/CBC/PKCS5Padding"</code>
* Default to <code>"AES/CBC/PKCS5Padding"</code> if this key is absent.
*
* </td>
* </tr>
* <tr>
* <td>x-amz-tag-len</td>
* <td>Tag length (in bits) when AEAD is in use.
*
* Only applicable if AEAD is in use. This meta information is absent
* otherwise, or if KMS is in use.
* Supported value: <code>"128"</code>
*
* </td>
* </tr>
* </table>
* <p>
* <h3>KMS Integration for client-side encryption</h3>
*
* All client-side KMS protected S3 objects are stored in v2 crypto meta information

* format. However, the key wrapping algorithm, x-amz-wrap-alg is always
* set to "kms".
* The KMS Customer Master Key ID is currently stored as part of the
* material description, x-amz-matdesc, under the key-name
* "kms_cmk_id".
*
* <p>
* <h4>Sample S3 crypto meta information for KMS client-side encryption</h4>
* <p>
* <h5>CryptoMode: Encryption Only</h5>
*
* <pre>
* x-amz-meta-x-amz-key-v2:
*
CiAJ2GqwpJRnt4izujwoalC2YdNRNSMEslG5rw3pEI+J8hKnAQEBAwB4CdhqsKSUZ7eIs7o8KGpQtmHTUTUj
BLJRua8N6RCPifIAAAB+MHwGCSqGSIb3DQEHBqBvMG0CAQAwaAYJKoZIhvcNAQcBMB4GCWCGSAFl
AwQBLjARBAyD0rzN3KHViWixDVcCARCAOwhZ6xA8rob3Z0mNx3uKFieHKVyIC/PKlchALvG1oVLnf86m
cZJNpTXtwMkKkDocVj3Z1zGjZTufFsOH
* x-amz-iv: xqOHh+M6y0UogwG5SHJM3Q==
* x-amz-unencrypted-content-length: 32768
* x-amz-cek-alg: AES/CBC/PKCS5Padding
* x-amz-wrap-alg: kms
* x-amz-matdesc: {"kms_cmk_id":"d3fd2273-4ca0-4da5-b1c2-c89742ec6a26"}
* </pre>
*
* <h5>CryptoMode: Authenticated Encryption</h5>
*
* <pre>
* x-amz-key-v2:
CiAJ2GqwpJRnt4izujwoalC2YdNRNSMEslG5rw3pEI+J8hKnAQEBAwB4CdhqsKSUZ7eIs7o8KGpQtmHTUTUj
BLJRua8N6RCPifIAAAB+MHwGCSqGSIb3DQEHBqBvMG0CAQAwaAYJKoZIhvcNAQcBMB4GCWCGSAFl
AwQBLjARBAytFVyW4I6QmwcPK1ECARCAO1VzoM6KxA9DHyNMm/BEbbjle2vLA7IY7f9OkUoSqrdxgKxp
NID9QaL/7928m1Djtld0bJpHefjm89C
* x-amz-iv: VZBksyij6DhrUMye
* x-amz-unencrypted-content-length: 32768
* x-amz-cek-alg: AES/GCM/NoPadding
* x-amz-wrap-alg: kms
* x-amz-matdesc: {"kms_cmk_id":"d3fd2273-4ca0-4da5-b1c2-c89742ec6a26"}
* x-amz-tag-len: 128
* </pre>
*
* <h2>S3 metadata of an instruction file</h2>
* <p>
* The following key is always included as part of the S3 metadata of the
* instruction file (which is just an S3 object). Since the SDK treats this key
* as "user metadata", the key name is always prefixed with x-amz-meta-
* when physically stored.
* <p>

```
* <table border=1>
* <tr aligned="left">
* <th>key</th>
* <th>description</th>
* </tr>
* <tr>
* <td width="200"><b>x-amz-crypto-instr-file</b></td>
* <td>the presence of this key is used to indicate this S3 object is an
* instruction file (of an associated client-side encrypted S3 object).</td>
* </tr>
* </table>
*/
```

Found in path(s):
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/package-info.java
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jar/com/amazonaws/services/s3/transfer/PauseResult.java
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jar/com/amazonaws/services/s3/internal/S3RequesterChargedResult.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/AbortIncompleteMultipartUpload.java
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jar/com/amazonaws/services/s3/transfer/MultipleFileUpload.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/DownloadMonitor.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/AbstractTransfer.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/S3ObjectInputStream.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/MultipleFileDownload.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/MultipleFileUploadImpl.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/MultipleFileDownloadImpl.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/MultipleFileTransfer.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/TransferStateChangeListener.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/transfer/internal/MultipleFileTransferMonitor.java

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jar/com/amazonaws/services/s3/internal/RepeatableCipherInputStream.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/internal/AbstractRepeatableCipherInputStream.java
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jar/com/amazonaws/services/s3/model/S3Object.java

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/RenewableCipherLiteInputStream.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoModuleAEStrict.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/PauseStatus.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/AWSS3V4Signer.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoModule.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/CipherFactory.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/CipherLite.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/AesCtr.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/AmazonS3EncryptionClient.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/internal/S3ProgressListener.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/AmazonS3Encryption.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/DigestValidationInputStream.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/CryptoModuleDispatcher.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/CryptoRuntime.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoModuleEO.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/CryptoMode.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoModuleBase.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/AesGcm.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/AesCbc.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/MultipartUploadCryptoContext.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/PersistableDownload.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoScheme.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3ObjectWrapper.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/CipherLiteInputStream.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3CryptoModuleAE.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/MultipartUploadCbcContext.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/internal/S3ProgressListenerChain.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/ContentCryptoScheme.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/PersistableTransfer.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/ContentCryptoMaterial.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/GCMCipherLite.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/internal/S3ProgressPublisher.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/internal/crypto/S3KeyWrapScheme.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/transfer/PersistableUpload.java
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/**
  * Gets the optional <code>versionIdMarker</code> parameter indicating where in the
  * sorted list of all versions in the specified bucket to begin returning
  * results. Results are always ordered first lexicographically (i.e.
  * alphabetically) and then from most recent version to least recent
  * version.
  * <p>
  * A key marker must be specified when specifying a <code>versionIdMarker</code>.
  * Results begin immediately after the version with the specified key and
  * version ID.
  * </p>
  *
  * @return The optional <code>versionIdMarker</code> parameter indicating where in the
  *   sorted list of all versions in the specified bucket to begin
  *   returning results.
  *
  * @see ListVersionsRequest#setVersionIdMarker(String)
  * @see ListVersionsRequest#withVersionIdMarker(String)
  */

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* permissions and limitations under the License.
*/
/**
* Interface for providing encryption materials.
* Implementations are free to use any strategy for providing encryption
* materials, such as simply providing static material that doesn't change,
* or more complicated implementations, such as integrating with existing
* key management systems.
*/

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/EncryptionMaterialsProvider.java
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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/auth/DecodedStreamBuffer.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/S3ObjectId.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/TopicConfiguration.java

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/SSECustomerKeyProvider.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/KeyWrapException.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/SimpleMaterialProvider.java

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/model/EncryptedPutObjectRequest.java

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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-jar/com/amazonaws/services/s3/OnFileDelete.java
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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/ObjectListing.java
* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
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* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/BucketVersioningConfiguration.java

* /opt/cola/permits/1547606390_1675761520.5442748/0/aws-java-sdk-s3-1-10-76-sources-
jar/com/amazonaws/services/s3/model/S3VersionSummary.java

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*/
// The Amazon S3 DevPay token header is a special exception and can be safely moved

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analysis/common/src/java/org/apache/lucene/analysis/de/GermanMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/es/SpanishLightStemmer.java
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analysis/common/src/java/org/apache/lucene/analysis/fr/FrenchMinimalStemmer.java
analysis/common/src/java/org/apache/lucene/analysis/hu/HungarianLightStemmer.java
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analysis/common/src/java/org/apache/lucene/analysis/pt/PortugueseLightStemmer.java
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Kuromoji Japanese Morphological Analyzer - Apache Lucene Integration
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jar/javax/annotation/concurrent/Immutable.java
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* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/InstructionAdapter.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/JSRInlinerAdapter.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/FieldRemapper.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/SimpleRemapper.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/ModuleTargetAttribute.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/TableSwitchGenerator.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/Remapper.java
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-jar/org/objectweb/asm/commons/CodeSizeEvaluator.java
No license file was found, but licenses were detected in source scan.

/**
 * Constructs a new {@link SerialVersionUIDAdder}. <i>Subclasses must not use this
 * constructor</i>. Instead, they must use the {@link #SerialVersionUIDAdder(int, ClassVisitor)}

```
 * version.
 *
 * @param classVisitor a {@link ClassVisitor} to which this visitor will delegate calls.
 * @throws IllegalStateException If a subclass calls this constructor.
 */
```

Found in path(s):
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-
jar/org/objectweb/asm/commons/SerialVersionUIDAdder.java
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```
/**
 * Constructs a new {@link GeneratorAdapter}. <i>Subclasses must not use this constructor</i>.
 * Instead, they must use the {@link #GeneratorAdapter(int, MethodVisitor, int, String, String)}
 * version.
 *
 * @param methodVisitor the method visitor to which this adapter delegates calls.
 * @param access the method's access flags (see {@link Opcodes}).
 * @param name the method's name.
 * @param descriptor the method's descriptor (see {@link Type}).
 * @throws IllegalStateException if a subclass calls this constructor.
 */
```

Found in path(s):
* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-
jar/org/objectweb/asm/commons/GeneratorAdapter.java
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/**

 * Constructs a new {@link LocalVariablesSorter}. <i>Subclasses must not use this constructor</i>.

 * Instead, they must use the {@link #LocalVariablesSorter(int, int, String, MethodVisitor)}

 * version.

 *

 * @param access access flags of the adapted method.

 * @param descriptor the method's descriptor (see {@link Type}).

 * @param methodVisitor the method visitor to which this adapter delegates calls.

 * @throws IllegalStateException if a subclass calls this constructor.

 */

Found in path(s):

* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-

jar/org/objectweb/asm/commons/LocalVariablesSorter.java

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/**

 * Constructs a new {@link AnnotationRemapper}. <i>Subclasses must not use this constructor</i>.

 * Instead, they must use the {@link #AnnotationRemapper(int,String,AnnotationVisitor,Remapper)}

 * version.

 *

 * @param descriptor the descriptor of the visited annotation. May be {@literal null}.

 * @param annotationVisitor the annotation visitor this remapper must delegate to.

 * @param remapper the remapper to use to remap the types in the visited annotation.

 */

Found in path(s):

* /opt/cola/permits/1288694265_1647366206.14/0/asm-commons-9-2-sources-

jar/org/objectweb/asm/commons/AnnotationRemapper.java

1.410 geb 0.9.2

1.410.1 Available under license :

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/** A very fast and memory efficient class to encode and decode to and from BASE64 in full accordance
* with RFC 2045.

* On Windows XP sp1 with 1.4.2_04 and later ;), this encoder and decoder is about 10 times faster
* on small arrays (10 - 1000 bytes) and 2-3 times as fast on larger arrays (10000 - 1000000 bytes)
* compared to <code>sun.misc.Encoder()/Decoder()</code>.

*
* On byte arrays the encoder is about 20% faster than Jakarta Commons Base64 Codec for encode and
* about 50% faster for decoding large arrays. This implementation is about twice as fast on very small
* arrays (&lt 30 bytes). If source/destination is a <code>String</code> this
* version is about three times as fast due to the fact that the Commons Codec result has to be recoded
* to a <code>String</code> from <code>byte[]</code>, which is very expensive.

*
* This encode/decode algorithm doesn't create any temporary arrays as many other codecs do, it only
* allocates the resulting array. This produces less garbage and it is possible to handle arrays twice
* as large as algorithms that create a temporary array. (E.g. Jakarta Commons Codec). It is unknown
* whether Sun's <code>sun.misc.Encoder()/Decoder()</code> produce temporary arrays but since performance
* is quite low it probably does.

*
* The encoder produces the same output as the Sun one except that the Sun's encoder appends
* a trailing line separator if the last character isn't a pad. Unclear why but it only adds to the
* length and is probably a side effect. Both are in conformance with RFC 2045 though.
* Commons codec seem to always att a trailing line separator.

*
* Note!
* The encode/decode method pairs (types) come in three versions with the exact same algorithm and
* thus a lot of code redundancy. This is to not create any temporary arrays for transcoding to/from different
* format types. The methods not used can simply be commented out.

*
* There is also a "fast" version of all decode methods that works the same way as the normal ones, but
* har a few demands on the decoded input. Normally though, these fast verions should be used if the source if
* the input is known and it hasn't bee tampered with.

*
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* @version 2.2

* @author Mikael Grev

*   Date: 2004-aug-02

*   Time: 11:31:11

*/

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* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/driver/DriverRegistry.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/ConfigurationLoader.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/download/DownloadException.java
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/textmatching/PatternTextMatcher.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/textmatching/TextMatcher.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/buildadapter/SystemPropertiesBuildAdapter.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/binding/BindingUpdater.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/download/DownloadSupport.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/buildadapter/BuildAdapterFactory.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/textmatching/NegatedTextMatcher.groovy
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* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/ClosureInnerNavigatorFactory.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/BrowserBackedNavigatorFactory.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/InvalidGebConfiguration.java
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-

jar/geb/navigator/factory/DefaultInnerNavigatorFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/NoNewWindowException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/AbstractNavigator.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/AbstractNavigatorFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/InnerNavigatorFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/NavigatorFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/report/ExceptionToPngConverter.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/factory/NavigatorBackedNavigatorFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/PageContentTemplateParams.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/Navigator.groovy

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* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/driver/DriverCreationException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/UnableToLoadAnyDriversException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/UnknownDriverShortNameException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/driver/NameBasedDriverFactory.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-

jar/geb/driver/CachingDriverFactory.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
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* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/Navigable.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/report/PageSourceReporter.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/content/NavigableSupport.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/content/PageContentTemplate.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/Browser.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/error/RequiredPageContentNotPresent.java
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/error/InvalidPageContent.java
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/js/JavascriptInterface.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/js/JQueryAdapter.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/report/PngUtils.java
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/content/SimplePageContent.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/js/AlertAndConfirmSupport.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/content/PageContentTemplateFactoryDelegate.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/driver/DriverFactory.groovy
* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-
jar/geb/report/CompositeReporter.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/report/ReporterSupport.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/ModuleBaseDefinitionDelegate.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/driver/RemoteDriverOperations.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/ModuleBaseCalculator.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/GebAssertionError.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/report/ScreenshotReporter.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/UndefinedPageContentException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/waiting/WaitingSupport.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/TemplateDerivedPageContent.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/PageContent.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/Page.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/UnexpectedPageException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/PageChangeListener.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/RequiredPageValueNotPresent.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/Module.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/textmatching/TextMatchingSupport.groovy

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/PageChangeListenerAlreadyRegisteredException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/error/UnresolvablePropertyException.java

* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/content/PageContentTemplateBuilder.groovy

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* /opt/cola/permits/1354023137_1658978114.0556712/0/geb-core-0-9-2-sources-jar/geb/navigator/SelectFactory.groovy

1.411 aop-alliance 1.0

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materials or that you have already sent this user a copy.

 For an executable, the required form of the "work that uses the
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  its purpose remains meaningful.

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AppleJavaExtensions
v 1.2

This is a pluggable jar of stub classes representing the new Apple eAWT and eIO APIs for Java 1.4 on Mac OS X. The purpose of these stubs is to allow for compilation of eAWT- or eIO-referencing code on platforms other than Mac OS X. The jar file is enclosed in a zip archive for easy expansion on other platforms.

These stubs are not intended for the runtime classpath on non-Mac platforms. Please see the OSXAdapter sample for how to write cross-platform code that uses eAWT.

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1.415 elasticsearch-mocksocket 1.2

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```
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    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/maven-v4_0_0.xsd">
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  <groupId>org.elasticsearch</groupId>
  <artifactId>mocksocket</artifactId>
  <packaging>jar</packaging>
  <version>1.2</version>
  <name>Elasticsearch MockSocket</name>
  <description>Allows using sockets without having to grant dangerous permissions to all of your
code.</description>
  <inceptionYear>2016</inceptionYear>
  <url>https://github.com/elastic/mocksocket</url>
  <developers>
    <developer>
      <name>Elastic</name>
      <url>http://www.elastic.co</url>
    </developer>
  </developers>

  <licenses>
    <license>
      <name>The Apache Software License, Version 2.0</name>
      <url>http://www.apache.org/licenses/LICENSE-2.0.txt</url>
```

```xml
            <distribution>repo</distribution>
        </license>
    </licenses>

    <scm>
        <connection>scm:git:git@github.com:elastic/mocksocket.git</connection>
        <developerConnection>scm:git:git@github.com:elastic/mocksocket.git</developerConnection>
        <url>https://github.com/elastic/mocksocket</url>
    </scm>

    <properties>
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        <maven.compiler.source>1.8</maven.compiler.source>
        <maven.compiler.target>1.8</maven.compiler.target>
    </properties>

    <distributionManagement>
        <snapshotRepository>
            <id>ossrh</id>
            <url>https://oss.sonatype.org/content/repositories/snapshots</url>
        </snapshotRepository>
    </distributionManagement>
    <build>
        <plugins>
            <plugin>
                <groupId>org.apache.maven.plugins</groupId>
                <artifactId>maven-jar-plugin</artifactId>
                <version>2.6</version>
                <configuration>
                    <forceCreation>true</forceCreation>
                </configuration>
            </plugin>
            <plugin>
                <groupId>org.apache.maven.plugins</groupId>
                <artifactId>maven-source-plugin</artifactId>
                <executions>
                    <execution>
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                        <goals>
                            <goal>jar</goal>
                        </goals>
                    </execution>
                </executions>
            </plugin>
            <plugin>
                <groupId>org.apache.maven.plugins</groupId>
                <artifactId>maven-javadoc-plugin</artifactId>
                <executions>
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```xml
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               <goals>
                  <goal>jar</goal>
               </goals>
            </execution>
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      </plugin>
      <plugin>
         <groupId>org.apache.maven.plugins</groupId>
         <artifactId>maven-gpg-plugin</artifactId>
         <version>1.5</version>
         <executions>
            <execution>
               <id>sign-artifacts</id>
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                  <goal>sign</goal>
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         </executions>
      </plugin>
      <plugin>
         <groupId>org.sonatype.plugins</groupId>
         <artifactId>nexus-staging-maven-plugin</artifactId>
         <version>1.6.7</version>
         <extensions>true</extensions>
         <configuration>
            <serverId>ossrh</serverId>
            <nexusUrl>https://oss.sonatype.org/</nexusUrl>
            <autoReleaseAfterClose>true</autoReleaseAfterClose>
         </configuration>
      </plugin>
   </plugins>
</build>

<dependencies>
</dependencies>
</project>
```

Found in path(s):
* /opt/cola/permits/1354022288_1657248911.498094/0/mocksocket-1-2-jar/META-
INF/maven/org.elasticsearch/mocksocket/pom.xml

1.416 testng 6.8.21

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*
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*******************************************************************************/
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jar/feign/InvocationHandlerFactory.java
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jar/feign/SynchronousMethodHandler.java
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jar/feign/auth/BasicAuthRequestInterceptor.java
* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/codec/EncodeException.java
* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Feign.java
* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Request.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/codec/ErrorDecoder.java

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* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Target.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/FeignException.java

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* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/ReflectiveFeign.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/RequestInterceptor.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Util.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Response.java

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/auth/Base64.java

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Found in path(s):

* /opt/cola/permits/1274700536_1645234140.34/0/feign-core-8-15-1-sources-jar/feign/Types.java

1.418 jsch 0.1.51

1.418.1 Available under license :

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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/TripleDESCTR.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES256CTR.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/ARCFOUR256.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/ARCFOUR128.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/ARCFOUR.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES192CTR.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES128CTR.java
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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Signature.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/HMACSHA256.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/HMAC.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/IdentityRepository.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/LocalIdentityRepository.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/HMACSHA512.java
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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES192CBC.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES128CBC.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelSubsystem.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestSubsystem.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/AES256CBC.java
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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/HostKeyRepository.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/GSSContext.java
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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/PBKDF.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/PBKDF.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/OpenSSHConfig.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/ConfigRepository.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KeyPairPKCS8.java

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* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KeyExchange.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/UserAuth.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KeyPairGenRSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Proxy.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Cipher.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KnownHosts.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-

jar/com/jcraft/jsch/CipherNone.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/SftpProgressMonitor.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Session.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/MD5.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelForwardedTCPIP.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Channel.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelX11.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestSignal.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ServerSocketFactory.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/BlowfishCBC.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/UserAuthNone.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestSftp.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/HMACSHA1.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/UserAuthPassword.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Request.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelShell.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/KeyPairGenDSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/JSchAuthCancelException.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelDirectTCPIP.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ProxyHTTP.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Identity.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/JSch.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/SHA256.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/UserAuthKeyboardInteractive.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/DH.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-

jar/com/jcraft/jsch/jcraft/Compression.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/DHGEX256.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/PortWatcher.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelSession.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Packet.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ForwardedTCPIPDaemon.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/KeyPairGenDSA.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/SftpStatVFS.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ProxySOCKS5.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Util.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/HostKey.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestShell.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/SftpException.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/KeyPairRSA.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Buffer.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/UIKeyboardInteractive.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/HMACMD596.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/SignatureDSA.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/IO.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/DH.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/HASH.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/DHGEX.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelExec.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestWindowChange.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jce/Random.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestX11.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/RequestEnv.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/SignatureDSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/IdentityFile.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KeyPairDSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/SocketFactory.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/RequestExec.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/SignatureRSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/RequestPtyReq.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/SHA1.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Random.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/JSchPartialAuthException.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/TripleDESCBC.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/HMACSHA196.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/ChannelSftp.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/UserInfo.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/DHG14.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/DHG1.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/JSchException.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/KeyPairGenRSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/SftpATTRS.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/Compression.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/UserAuthPublicKey.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/SignatureRSA.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/KeyPair.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/jce/HMACMD5.java

* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-jar/com/jcraft/jsch/MAC.java

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jar/com/jcraft/jsch/jcraft/HMAC.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jcraft/HMACSHA1.java
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jar/com/jcraft/jsch/RequestAgentForwarding.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/ChannelAgentForwarding.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jcraft/HMACMD5.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jcraft/HMACMD596.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/jcraft/HMACSHA196.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-
jar/com/jcraft/jsch/Logger.java
* /opt/ws_local/PERMITS_SQL/1018976942_1591372579.04/0/jsch-0-1-51-sources-

jar/com/jcraft/jsch/jgss/GSSContextKrb5.java
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