Program:
  ProgramDeclaration ClassDeclarations

ProgramDeclaration:
  PROGRAM COLON *ClassName ProgramArguments*

ClassName:
  IDENTIFIER
  | IDENTIFIER LEFT_SQUARE_BRACKET *ClassName*
                         RIGHT_SQUARE_BRACKET

ProgramArguments:
  /empty/
  | LEFT_PAREN *Literals* RIGHT_PAREN

Literals:
  | *Literal*
  | *Literal* COMMA *Literals*

Literal:
  INTEGER
  | REAL
  | BOOLEAN

Arguments:
  /empty/
  | LEFT_PAREN *Expressions* RIGHT_PAREN

Expressions:
  | *Expression*
  | *Expression* COMMA *Expressions*

Expression:
  Primary
  | *CompoundExpression*

Primary:
      INTEGER
      | REAL
      | BOOLEAN
      | THIS
      | ClassName

CompoundExpression:
      IDENTIFIER
      | IDENTIFIER LEFT_PAREN *Arguments* RIGHT_PAREN
      | IDENTIFIER DOT *CompoundExpression*
      | IDENTIFIER LEFT_PAREN *Arguments* RIGHT_PAREN DOT
                              CompoundExpression

ClassDeclarations:
      ClassDeclaration
      | *ClassDeclaration ClassDeclarations*

ClassDeclaration:
      CLASS *ClassName Extension* IS Class*Body* END

Extension:
      /empty/
      | EXTENDS *ClassName*

Class*Body:*
      MemberDeclarations

MemberDeclarations:
      /empty/
      | *MemberDeclaration*
      | *MemberDeclaration MemberDeclarations*

MemberDeclaration:
      VariableDeclaration
      | *MethodDeclaration*
      | *ConstructorDeclaration*

VariableDeclaration:
    VAR *VariableName* COLON *Expression*

VariableName:
    IDENTIFIER

MethodDeclaration:
    METHOD *MethodName* LEFT_PAREN *Parameters*
                RIGHT_PAREN *ReturnType* IS *Body* END

MethodName:
    IDENTIFIER

Parameters:
    /empty/
    | *Parameter*
    | *Parameter* COMMA *Parameters*

Parameter:
    IDENTIFIER COLON *ClassName*

ReturnType:
    | *ClassName*

ConstructorDeclaration:
    THIS *Parameters* IS *Body* END

Body:
    BodyDeclarations

BodyDeclarations:
    BodyDeclaration
    | *BodyDeclaration BodyDeclarations*

BodyDeclaration:
    VariableDeclaration
    | *Statement*

Statement:
    Assignment
    | *WhileLoop*
    | *IfStatement*
    | *ReturnStatement*

Assignment:
    VariableName COLON_EQUAL *Expression*

WhileLoop:
    WHILE *Expression* LOOP *Body* END

IfStatement:
    IF *Expression IfBranch ElseBranch* END

IfBranch:
    THEN *Body*

ElseBranch:
    /empty/
    | ELSE *Body*

ReturnStatement:
    RETURN
    | RETURN *Expression*