

### Scope:

- This miniJava compiler is implemented with all of the specifications listed in the documents for pa1 to pa4. In addition, the functionality of simple for loops is added.
- The parser will accept the following syntax for for-loops:
  - `for ((varDeclStmt | assignStmt | callStmt)) (Expression);  
(Reference = Expression | Reference(ArgumentList?))* statement`
- The Identification pass will check that statement is not a varDeclStmt while delegating the identification of the subcomponents to their respective visit statements.
- The type checking pass will then check that the result of the Expression is of Boolean type.

### Summary of changes to AST classes:

- The class ClassDecl now has a HashMap named membersTable that records the members of each class.
- The class Reference now has Declaration named decl that records the variable declaration that it is referring to.
- The class NullLiteral is created as a subclass of Terminal class, and is used to represent the null literal.
- An equals method is created for the TypeDenoter, BaseType, ArrayType, and ClassType classes to properly assess equality of two types in type checking.
- NULL is added to the TypeKind enum to account for the existence of the null type.
- The class MemberDecl now has the field isPublic and isMain.
- The class ForStmt is added as a subclass of Statement to account for the existence of for-loops.
- The method visitForStmt is added to the Visitor interface, and ASTDisplay is modified to add the implementation of visitForStmt.

### Test Descriptions:

Included are 4 failing tests and 5 passing tests. The passing tests should compile to a program that prints out the test number

- Fail1
  - for loops can't have varDeclStmt as its only statement
- Fail2
  - loop condition expression does not have type Boolean
- Fail3
  - empty statement after comma in variable increment statements
- Fail4
  - variable declared in for loop can't be used outside of it
- Pass1
  - tests for variable initialization statement as call statement
- Pass2

- test for handling of missing parameters in for loop
- Pass3
  - declaration of loop variable outside of for loop and inside of for loop
- Pass4
  - esoteric for loops with loop condition being the result of a method call and with multiple updating conditions
- Pass5
  - nested for loops