

System Test Plan Mutation Based Testing

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1. System Under Test

Compilers is a free and open-source project accessible on GitHub. The project under test covers a compiler that parses the input and generates a syntax tree. The project was created by developing context-free grammar in order to generate parsing rules and perform lexical analysis on the language.

1.1. Details

Project source code: <https://github.com/Niljas/Compiler-Design-Project>

Number of the components for Compilers

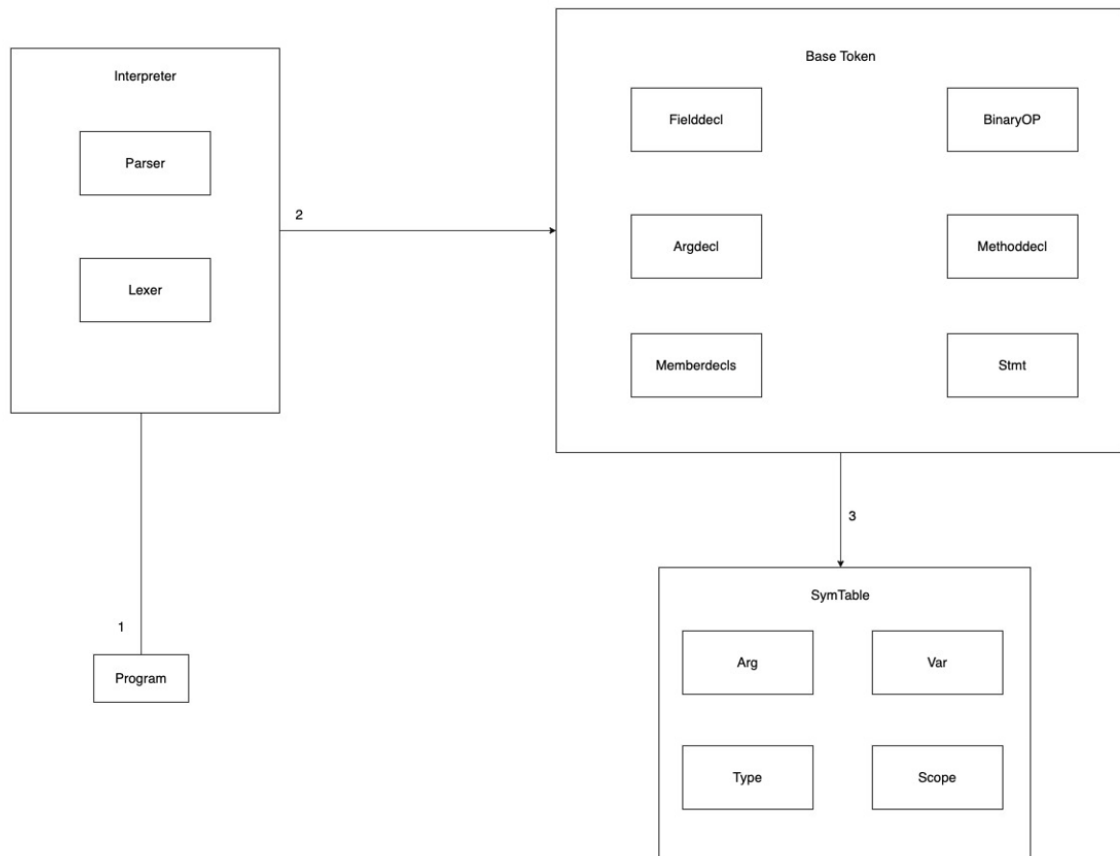
- Compiler Design Project (CDP):
 - 2 packages
 - 15 class files
 - 1 interface
 - 1 make file

Lines of code for each component

- Argdecl: 17 LOC
- BaseToken: 134 LOC
- BinaryOP: 19 LOC
- Checkable: 6 LOC (Interface)
- Compiler-Design-Project-Main: 12 LOC (Package 1)
- Expr: 207 LOC
- Fielddecl: 46 LOC
- Grammar: 97 LOC
- Interpreter: 37 LOC
- LexerRules: 17 LOC
- Makefile: 75 LOC (Make File)
- Memberdecls: 38 LOC
- Methoddecl: 66 LOC
- Name: 37 LOC
- ParserTest: 30 LOC
- Program: 16 LOC
- Stmt: 215 LOC
- SymTable: 74 LOC
- Tokens: 314 LOC (Package 2)
- TypeChecking: 32 LOC

Total LOC: 1489

1.2. Software Architecture



2. Test Environment

- The project under test is deployed under IntelliJ IDEA 2022.1.1 (Community Edition).
- It uses Junit 5 for unit testing.
- The Operating System that is used to run the tests is Windows 11 & Mac OS (Monterey 12.6).
- The version of Java that is being used is 17.0.2.

3. Mutation Based Testing

3.1. public boolean isRelational()

3.1.1 Mutation [ID 1]

Description of mutant:

- Delete op.equals("<")
- Line 11, Class BinaryOp
- return op.equals("<") || op.equals("<=") || op.equals(">") || op.equals(">=") || op.equals("==");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "<" || op != "<=" || op != ">" || op != ">=" || op != "=="
- Propagation: op.equals("<") == false || op.equals("<=") == false || op.equals(">") == false || op.equals(">=") == false || op.equals("==") == false

3.1.2 Mutation [ID 2]

Description of mutant:

- Delete op.equals("==")
- Line 11, Class BinaryOp
- return op.equals("<") || op.equals("<=") || op.equals(">") || op.equals(">=") || op.equals("<");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "<" || op != "<=" || op != ">" || op != ">=" || op != "<";
- Propagation: op.equals("<") == false || op.equals("<=") == false || op.equals(">") == false || op.equals(">=") == false || op.equals("<") == false

3.1.3 Mutation [ID 3]

Description of mutant:

- Delete op.equals(">=")
- Line 11, Class BinaryOp
- return op.equals("<") || op.equals("<=") || op.equals(">") || op.equals("==") || op.equals("<");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "<" || op != "<=" || op != ">" || op != "<" || op != "=="
- Propagation: op.equals("<") == false || op.equals("<=") == false || op.equals(">") == false || op.equals("==") == false || op.equals("<") == false

3.1.4 Mutation [ID 4]

Description of mutant:

- Delete `op.equals(">")`
- Line 11, Class `BinaryOp`
- `return op.equals("<") || op.equals("<=") || op.equals(">=") || op.equals("==") || op.equals("<>");`

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `op != "<" || op != "<=" || op != "<>" || op != ">=" || op != "=="`;
- Propagation: `op.equals("<") == false || op.equals("<=") == false || op.equals(">=") == false || op.equals("==") == false || op.equals("<>") == false`;

3.1.5 Mutation [ID 5]

Description of mutant:

- Delete `op.equals("<=")`
- Line 11, Class `BinaryOp`
- `return op.equals("<") || op.equals(">") || op.equals(">=") || op.equals("==") || op.equals("<>");`

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `op != "<" || op != "<>" || op != ">" || op != ">=" || op != "=="`;
- Propagation: `op.equals("<") == false || op.equals(">") == false || op.equals(">=") == false || op.equals("==") == false || op.equals("<>") == false`;

3.1.6 Mutation [ID 6]

Description of mutant:

- Delete `op.equals("<")`
- Line 11, Class `BinaryOp`
- `return op.equals("<=") || op.equals(">") || op.equals(">=") || op.equals("==") || op.equals("<>");`

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `op != "<>" || op != "<=" || op != ">" || op != ">=" || op != "=="`;
- Propagation: `op.equals("<=") == false || op.equals("<=") == false || op.equals(">=") == false || op.equals("==") == false || op.equals("<>") == false`;

3.2 public Boolean isLogical()

3.2.1 Mutation [ID 7]

Description of mutant:

- Delete op.equals("||")
- Line 14, Class BinaryOp
- return op.equals("&&");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "&&";
- Propagation: op.equals("&&") == false;

3.2.2 Mutation [ID 8]

Description of mutant:

- Delete op.equals("&&")
- Line 14, Class BinaryOp
- return op.equals("||");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "||";
- Propagation: op.equals("||") == false;

3.3 public boolean isArithmetic()

3.3.1 Mutation [ID 9]

Description of mutant:

- Delete op.equals("+")
- Line 8, Class BinaryOp
- return op.equals("-") || op.equals("*") || op.equals("/");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "-" || op != "*" || op != "/" ;
- Propagation: op.equals("-") == false || op.equals("*") == false || op.equals("/") == false;

3.3.2 Mutation [ID 10]

Description of mutant:

- Delete op.equals("-")
- Line 8, Class BinaryOp
- return op.equals("+") || op.equals("*") || op.equals("/");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "+" || op != "*" || op != "/" ;
- Propagation: op.equals("+") == false || op.equals("*") == false || op.equals("/") == false;

3.3.3 Mutation [ID 11]

Description of mutant:

- Delete op.equals("*")
- Line 8, Class BinaryOp
- return op.equals("+") || op.equals("-") || op.equals("/");

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: op != "+" || op != "-" || op != "/" ;
- Propagation: op.equals("+") == false || op.equals("-") == false || op.equals("/") == false;

3.3.4 Mutation [ID 12]

Description of mutant:

- Delete `op.equals("/")`
- Line 8, Class `BinaryOp`
- `return op.equals("+") || op.equals("-") || op.equals("*");`

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `op != "+" || op != "-" || op != "*" ;`
- Propagation: `op.equals("+") == false || op.equals("-") == false || op.equals("*") == false;`

3.4 Public Expr String toString()

3.4.1 Mutation [ID 13]

Description of mutant:

- Delete case 12
- Line 70, Class Expr
- All cases except case 12

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `this.typeNumber != 12`
- Propagation: case (0 – 11)

3.4.2 Mutation [ID 14]

Description of mutant:

- Delete case 0
- Line 70, Class Expr
- All cases except case 0

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: `this.typeNumber != 0`
- Propagation: case (1 – 12)

3.4.3 Mutation [ID 15]

Description of mutant:

- Delete case 1
- Line 72, Class Expr
- All cases except case 1

This mutant is strongly killable based on the following:

- Reachability: `r(case 0) = false` and `r(case 12) = false`
- Infection: `this.typeNumber != 1`
- Propagation: case (0, 2 – 12)

3.4.4 Mutation [ID 16]

Description of mutant:

- Delete case 2
- Line 74, Class Expr
- All cases except case 2

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 2$
- Propagation: case (0 - 1, 3 - 12)

3.4.5 Mutation [ID 17]

Description of mutant:

- Delete case 3
- Line 76, Class Expr
- All cases except case 3

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 3$
- Propagation: case (0 - 2, 4 - 12)

3.4.6 Mutation [ID 18]

Description of mutant:

- Delete case 4
- Line 78, Class Expr
- All cases except case 4

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 4$
- Propagation: case (0 - 3, 5 - 12)

3.4.7 Mutation [ID 19]

Description of mutant:

- Delete case 5
- Line 80, Class Expr
- All cases except case 5

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 5$
- Propagation: case (0 - 4, 6 - 12)

3.4.8 Mutation [ID 20]

Description of mutant:

- Delete case 6
- Line 82, Class Expr
- All cases except case 6

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 6$
- Propagation: case (0 - 5, 7 - 12)

3.4.9 Mutation [ID 21]

Description of mutant:

- Delete case 7
- Line 84, Class Expr
- All cases except case 7

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 7$
- Propagation: case (0 - 6, 8 - 12)

3.4.10 Mutation [ID 22]

Description of mutant:

- Delete case 8
- Line 86, Class Expr
- All cases except case 8

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 8$
- Propagation: case (0 - 7, 9 - 12)

3.4.11 Mutation [ID 23]

Description of mutant:

- Delete case 9
- Line 88, Class Expr
- All cases except case 9

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 9$
- Propagation: case (0 - 8, 10 - 12)

3.4.12 Mutation [ID 24]

Description of mutant:

- Delete case 10
- Line 90, Class Expr
- All cases except case 10

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$, $r(\text{case } 9) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 10$
- Propagation: case (0 - 10, 11 - 12)

3.4.13 Mutation [ID 25]

Description of mutant:

- Delete case 11
- Line 98, Class Expr
- All cases except case 11

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$ and $r(\text{case } 12) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$, $r(\text{case } 9) = \text{false}$, $r(\text{case } 10) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 11$
- Propagation: case (0 - 10, 12)

3.5 Public Stmt String toString(int depth)

3.5.1 Mutation [ID 26]

Description of mutant:

- Delete case 0
- Line 67, Class Stmt
- All cases except case 0

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: this.typeNumber != 0
- Propagation: !case(1 – 11)

3.5.2 Mutation [ID 27]

Description of mutant:

- Delete case 1
- Line 72, Class Stmt
- All cases except case 1

This mutant is strongly killable based on the following:

- Reachability: r(case 0) = false
- Infection: this.typeNumber != 1
- Propagation: !case(0, 2 – 11)

3.5.3 Mutation [ID 28]

Description of mutant:

- Delete case 2
- Line 80, Class Stmt
- All cases except case 2

This mutant is strongly killable based on the following:

- Reachability: r(case 0) = false, r(case 1) = false
- Infection: this.typeNumber != 2
- Propagation: !case(0 - 1, 3– 11)

3.5.4 Mutation [ID 29]

Description of mutant:

- Delete case 3
- Line 89, Class Stmt
- All cases except case 3

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 3$
- Propagation: $\text{!case}(0 - 2, 4 - 11)$

3.5.5 Mutation [ID 30]

Description of mutant:

- Delete case 4
- Line 92, Class Stmt
- All cases except case 4

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 4$
- Propagation: $\text{!case}(0 - 3, 5 - 11)$

3.5.6 Mutation [ID 31]

Description of mutant:

- Delete case 5
- Line 95, Class Stmt
- All cases except case 5

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 5$
- Propagation: $\text{!case}(0 - 4, 6 - 11)$

3.5.7 Mutation [ID 32]

Description of mutant:

- Delete case 6
- Line 103, Class Stmt
- All cases except case 6

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 6$
- Propagation: $\text{!case}(0 - 5, 7 - 11)$

3.5.8 Mutation [ID 33]

Description of mutant:

- Delete case 7
- Line 109, Class Stmt
- All cases except case 7

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 7$
- Propagation: $\text{!case}(0 - 6, 8 - 11)$

3.5.9 Mutation [ID 34]

Description of mutant:

- Delete case 8
- Line 115, Class Stmt
- All cases except case 8

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 8$
- Propagation: $\text{!case}(0 - 7, 9 - 11)$

3.5.10 Mutation [ID 35]

Description of mutant:

- Delete case 9
- Line 117, Class Stmt
- All cases except case 9

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 9$
- Propagation: $\text{!case}(0 - 8, 10 - 11)$

3.5.11 Mutation [ID 36]

Description of mutant:

- Delete case 10
- Line 119, Class Stmt
- All cases except case 10

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$, $r(\text{case } 9) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 10$
- Propagation: $\text{!case}(0 - 9, 11)$

3.5.12 Mutation [ID 37]

Description of mutant:

- Delete case 11
- Line 121, Class Stmt
- All cases except case 11

This mutant is strongly killable based on the following:

- Reachability: $r(\text{case } 0) = \text{false}$, $r(\text{case } 1) = \text{false}$, $r(\text{case } 2) = \text{false}$, $r(\text{case } 3) = \text{false}$, $r(\text{case } 4) = \text{false}$, $r(\text{case } 5) = \text{false}$, $r(\text{case } 6) = \text{false}$, $r(\text{case } 7) = \text{false}$, $r(\text{case } 8) = \text{false}$, $r(\text{case } 9) = \text{false}$, $r(\text{case } 10) = \text{false}$
- Infection: $\text{this.typeNumber} \neq 11$
- Propagation: $\text{!case}(0 - 10)$

3.6 Public Fielddecl String toString(int depth)

3.6.1 Mutation [ID 38]

Description of mutant:

- Delete case 0
- Line 22, Class Fielddecl
- Source Code:
case 1:
 return getTabs(depth) + type + " " + id + "[" + arrLength + "]" + ";";
default:
 return "";

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: this.typeNumber != 0
- Propagation: !case 1

3.6.2 Mutation [ID 39]

Description of mutant:

- Delete case 1
- Line 24, Class Fielddecl
- Source Code:
case 0:
 return getTabs(depth) + (isFinal ? "final " : "") + type + " " + id +
(opex != null ? " = "+ opex.toString() : "") + ";";
default:
 return "";

This mutant is strongly killable based on the following:

- Reachability: r(case 0) = false
- Infection: this.typeNumber != 1
- Propagation: !case 0

3.7 Public Memberdecls String toString(int depth)

3.7.1 Mutation [ID 40]

Description of mutant:

- Delete two for loops
- Line 23, Class Memberdecls
- Source Code:
String result = "";
return result;

This mutant is strongly killable based on the following:

- Reachability: true
- Infection: f != NULL && m != NULL
- Propagation: result == ""

4. Test Results with Traceability

[Using a table, log the test results – MUT is method under test]

Test ID	Mutation ID	MUT	Input	Observed Output – Original Method	Observed Output – Mutated Method	Result
1	1	isRelational	“<”	True	False	Killed
2	2	isRelational	“==”	True	False	Killed
3	3	isRelational	“>=”	True	False	Killed
4	4	isRelational	“>”	True	False	Killed
5	5	isRelational	“<=”	True	False	Killed
6	6	isRelational	“<”	True	False	Killed
7	7	isLogical	“ ”	True	False	Killed
8	8	isLogical	“&&”	True	False	Killed
9	9	isArithmetic	“+”	True	False	Killed
10	10	isArithmetic	“-”	True	False	Killed
11	11	isArithmetic	“*”	True	False	Killed
12	12	isArithmetic	“/”	True	False	Killed
13	13	Expr toString	Typenumber==12	“foo”	“”	Killed
14	14	Expr toString	Typenumber==0	“foo”	“”	Killed
15	15	Expr toString	Typenumber==1	1	“”	Killed
16	16	Expr toString	Typenumber==2	1.0	“”	Killed
17	17	Expr toString	Typenumber==3	“foo”	“”	Killed
18	18	Expr toString	Typenumber==4	“true”	“”	Killed
19	19	Expr toString	Typenumber==5	111	“”	Killed
20	20	Expr toString	Typenumber==6	“(boo foo)”	“”	Killed
21	21	Expr toString	Typenumber==7	“(int)x	“”	Killed
22	22	Expr toString	Typenumber==8	“(y + y)”	“”	Killed
23	23	Expr toString	Typenumber==9	“(1 ? 1 : 1)”	“”	Killed
24	24	Expr toString	Typenumber==10	“foo(x, len)”	“”	Killed
25	25	Expr toString	Typenumber==11	“sum()”	“”	Killed
26	26	Stmt toString	Typenumber==0	“if (1) { x(); } else { y(); }”	“”	Killed
27	27	Stmt toString	Typenumber==1	“foo();”	“”	Killed
28	28	Stmt toString	Typenumber==2	“{	“”	Killed

				}		
				”		
29	29	Stmt toString	Typenumber==3	“ while (1) x(); ”	“”	Killed
30	30	Stmt toString	Typenumber==4	“x = 1;”	“”	Killed
31	31	Stmt toString	Typenumber==5	“read();”	“”	Killed
32	32	Stmt toString	Typenumber==6	“print();”	“”	Killed
33	33	Stmt toString	Typenumber==7	“not();”	“”	Killed
34	34	Stmt toString	Typenumber==8	“xvar;”	“”	Killed
35	35	Stmt toString	Typenumber==9	“return 1;”	“”	Killed
36	36	Stmt toString	Typenumber==10	“x();”	“”	Killed
37	37	Stmt toString	Typenumber==11	“return;”	“”	Killed
38	38	Fielddecl toString	declType==0	“final int 1 = 1;”	“”	Killed
39	39	Fielddecl toString	declType==1	“int value[3];\n\n”	“”	Killed
40	40	Memberdecls toString	depth = 0	“int value[3];\n\n”	“”	Killed