

CS 1632 - DELIVERABLE 5: Static Analysis

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Github URL: [https://github.com/Ningyou134679/
CS1632_Deliverable5](https://github.com/Ningyou134679/CS1632_Deliverable5)

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CS1632_Deliverable5.git](https://github.com/Ningyou134679/CS1632_Deliverable5.git)

Summary

First of all, my output for the program is not an optimal solution, meaning that the covering array generated does not contain the minimal necessary test cases. However, I confirmed with Dr. Laboon and an optimal solution for this program is unnecessary for this assignment.

Other than that, there is no outstanding issues with the program, according to the requirement. All bugs in findBugs are fixed, checkstyle does not report an error. See screenshot in later pages for details.

The algorithm of the program is as follows:

1. Inputting n number of arguments, where $n \geq 2$
2. For number 0 to $2^n - 1$, treat each number as a test case
 1. For example, 2 arguments will result in 0, 1, 2, 3, in total 4 test cases
3. Treat every pair of bits in the number as a pair of arguments
 1. For example, 2 stands for 010, then 01, 00, 10 will be 3 pairs
4. For every test case
 1. Skip if the same test case already exists in the covering array
 2. For every pair of bits in that test case, if a test case is not covered for a pair, add it to the covering array
 1. For example, say we are checking the 0th and 2nd index bit, then test case 010 and 000 both cover the same pair, and we can exclude one of them

Program output

```
CS1632_D5 — -bash — 181x56
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ clear

ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ javac -cp ./junit-4.12.jar:./hancrest-core-1.3.jar:./mockito-core-1.10.19.jar:./objenesis-2.4.jar *java
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise
Please enter at least two parameters!
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise dog
Please enter at least two parameters!
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise dog cat
dog      cat
0        0
0        1
1        0
1        1

ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise dog cat bird
dog      cat      bird
0        0        0
0        0        1
0        1        0
0        1        1
1        0        0
1        0        1
1        1        0

ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise dog cat lizard
dog      cat      lizard
0        0        0
0        0        1
0        1        0
0        1        1
1        0        0
1        0        1
1        1        0

ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ javac -cp ./junit-4.12.jar:./hancrest-core-1.3.jar:./mockito-core-1.10.19.jar:./objenesis-2.4.jar *java
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java -jar ./checkstyle-7.0-all.jar -c ./google_checks_modified.xml *.java
Starting audit...
Audit done.
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java Pairwise dog cat lizard bird
dog      cat      lizard      bird
0        0        0        0
0        0        0        1
0        0        1        0
0        0        1        1
0        1        0        0
0        1        0        1
0        1        1        0
1        0        0        0
1        0        0        1
1        0        1        0
1        1        0        0

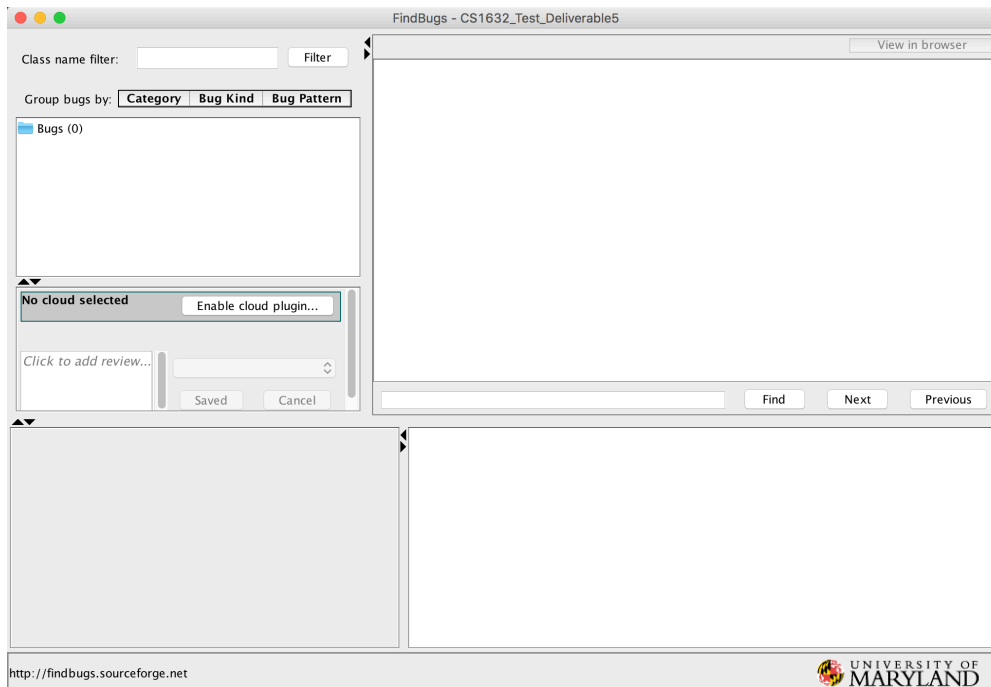
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$
```

Test output

```
CS1632_D5 — -bash — 80x23
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ javac -cp ./junit-4.12.jar:./hancrest-core-1.3.jar:./mockito-core-1.10.19.jar:./objenesis-2.4.jar *java
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java -cp ./junit-4.12.jar:./hancrest-core-1.3.jar:./mockito-core-1.10.19.jar:./objenesis-2.4.jar TestRunner

ALL TESTS PASSED
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$
```

Find bugs



Checkstyle

```
CS1632_D5 — -bash — 80x23
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$ java -jar ./checkstyle-7.0-all.jar -c ./google_checks_modified.xml ./*.java
Starting audit...
Audit done.
ZhengSimings-MacBook-Pro:CS1632_D5 zhengsiming$
```