CS1632 – DELIVERABLE 6: Static Analysis of the Sieve of Eratosthenes

<https://github.com/nda7/bug-fodder>

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**Summary**

To fix the code issues found by FindBugs, I simply looked at the method causing the error and corrected it. FindBugs found a total of 5 errors and they were corrected as follows:

* **Error 1:** *new IllegalArgumentException() not thrown in Sieve.calculateMax(String[])*
  + **Fix:** I added the word “throws” before the creation of the new IllegalArgumentException().
* **Error 2:** *Nullcheck of results at line 42 of value previously dereferenced in Sieve.PrintSieve(int[])*
  + **Fix:** To correct this I changed the if statement to read “if (results.length != 1)”. Because the array is never NULL and the length is always at least 1, the old if statement would never be false. Using this new if statement, the printSieve method will return “BLANK” when the only prime number in the input array is 1. Otherwise it will print the results.
* **Error 3:** *The method name Sieve.PrintSieve(int[]) doesn’t start with a lower case letter*
  + **Fix:** The obvious fix here was to change the method name to printSieve.
* **Error 4:** Sieve.convertResults(int[], boolean[]) invokes inefficient new Integer(int) constructor; use Integer.valueOf(int) instead
  + **Fix:** Again I followed the suggestion of the FindBugs program. Instead of creating a new Integer within the loop, I used the Integer.valueOf(int) function.
* **Error 5:** Dead store to size in Sieve.generateSieve(int)
  + **Fix:** The variable “size” in the generateSieve method was never used. Therefore I deleted the declaration for this variable to correct this error.

When correcting these bugs I found that there were two changes that affected functionality. Both my fixes for Error 1 and Error 2 modify the way the program behaves. In order to ensure both affected methods still function properly, I wrote up 2 unit tests for each.

The CheckStyle application was also very simple to use. The common errors I encountered were lines being more than 100 characters (this was due to my added comments), array brackets placed on the wrong side of the variable name, incorrect variable names, and alignment errors. These were all corrected with simple fixes.

Please note that when uploading to GitHub I was unable to name my sieve.java file with a capital S. This will prevent it from compiling as the class name is Sieve.java. Also note that when copying files into Eclipse the alignment is altered. I am not sure if remains a problem when reading a file written in Eclipse with another editor, but I’ve included before and after screenshots of my FindBugs and CheckStyle outputs below.

