SE/CS 2S03: Principles of Programming

Due on November 1st

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Idea

The goals of this assignment are:

1. get more practice with Java
2. deepen understanding of some of the basic constructs
3. do some *refactoring* of code to improve it.

The Task

On the assignment page, you will find as a link your userid. That link leads to a single Java file, `BadCode.Java`. Note that every instance of `BadCode.java` is different.

Your task is to perform a *very specific* set of changes to your given file. You will need to hand in the results of each transformation step.

Very Important: you should perform the *specific* set of changes asked, and **nothing else**, even though you might notice some *obvious* improvements that could be made! You **will** be penalized for performing extra steps (or too early).

The steps:

1. Remove the use of global variables. (Make them local)
2. Unwind each `while` loop *once*, into the semantically equivalent `if-then-else` [see note below]
3. Eliminate the `if-then-else`, and the variables which are no longer used. [see note]
4. Inline the computations into a single return line, and simplify the resulting arithmetic expression.

Notes:

- In general, `while` loops cannot be *finitely* unwound, never mind being unwound a single time to obtain an equivalent program! This case is specifically engineering to 'work'.
- In general, conditions in an `if-then-else` are not constant, but again things here were specifically engineered.

Submission Requirements

- A *single* zip file containing 4 java files, `step1.java`, `step2.java`, `step3.java`, and `step4.java`. `step`i`.java` is the result of the i$^{\text{th}}$ transformation step, starting from `BadCode.java`, ending in `step4.java`.

Bonus

Each one of these will be worth extra marks:

- Show how to use Eclipse's refactoring tools to perform the above steps. This can be done by providing a 'script' (best), or providing a video of the same.
- Do as above, but with IntelliJ IDEA instead of Eclipse.