AP CS Expression, Variables & Loops Lab Worksheet

Portions from the Supplemental Labs from: Building Java Programs, for Chapter 2 by Stuart Reges and Marty Stepp (http://www.buildingjavaprograms.com/)

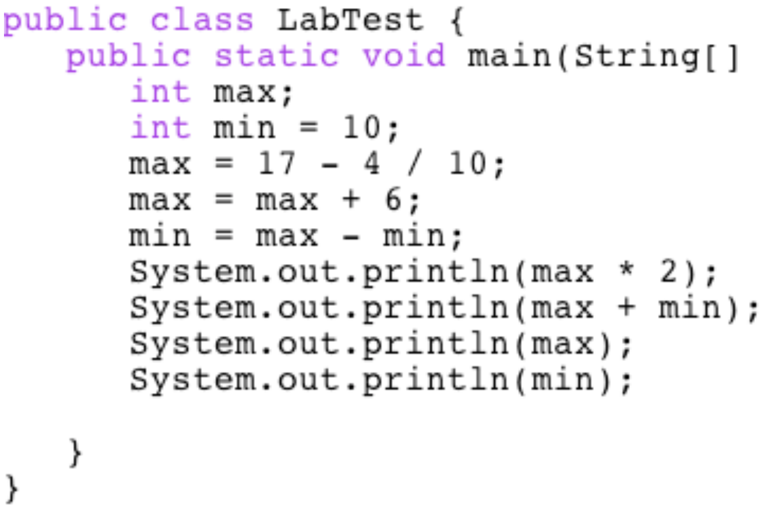
Expressions

1. Compute the value of each expression below. Be sure to list a literal of appropriate type (e.g., `7.0` rather than `7` for a `double`, string literals in quotes).

Expression	Expression
`4 * 3/8 + 2.5 * 2`	`(2.5 + 3.5)/2`
`26 % 10 % 4 * 3`	`9/4 * 2.0 - 5/4`
`(5 * 7.0/2 - 2.5)/5 * 2`	`3 * 4 + 2 * 3`
`12/7 * 4.4 * 2/4`	`177 % 100 % 10/2`
`"hello 34 " + 2 * 4`	`9/2.0 + 7/3 - 3.0/2`
`"2 + 2 " + 3 + 4`	`813 % 100/3 + 2.4`
`3 + 4 + " 2 + 2"`	`27/2/2.0 * (4.3 + 1.7) - 8/3`
`41 % 7 * 3/5 + 5/2 * 2.5`	`89 % (5 + 5) % 5`
`22 + 4 * 2`	`4.0/2 * 9/2`
`10.0/2/4`	`392/10 % 10/2`
`23 % 8 % 3`	`53/5/(0.6 + 1.4)/2 + 13/2`
`17 % 10/4`	`8 * 2 - 7/4`
`8/5 + 13/2/3.0`	`37 % 20 % 3 * 4`
`12 - 2 - 3`	`2.5 * 2 + 8/5.0 + 10/3`
`6/2 + 7/3`	`2 * 3/4 * 2/4.0 + 4.5 - 1`
`6 * 7%4`	`89 % 10/4 * 2.0/5 + (1.5 + 1.0/2) * 2`

Variables

2. What is the output from the following code? [Do NOT enter it into JGrasp]



```
public class LabTest {
   public static void main(String[] args) {
      int max;
      int min = 10;
      max = 17 - 4 / 10;
      max = max + 6;
      min = max - min;
      System.out.println(max * 2);
      System.out.println(max + min);
      System.out.println(max);
      System.out.println(min);

   }
}
```

for Loops

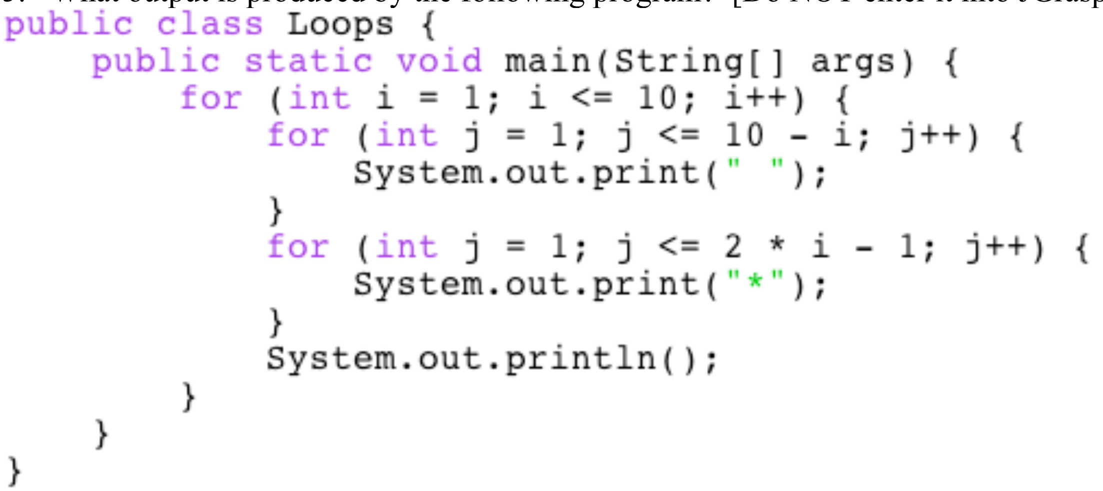
3. Assume that you have a variable called `count` that will take on the values 1, 2, 3, 4, and so on. You are going to formulate expressions in terms of `count` that will yield different sequences. For example, to get the sequence 2, 4, 6, 8, 10, 12, ..., you would use the expression `(2 * count)`. Fill in the table below, indicating an expression that will generate each sequence.

Sequence	Expression
4, 19, 34, 49, 64, 79, ...	
30, 20, 10, 0, -10, -20, ...	
-7, -3, 1, 5, 9, 13, ...	
97, 94, 91, 88, 85, 82, ...	

4. Create a class and call it something descriptive. Write and call methods that do the following (don't worry about any extra blank newlines):
a) Print out the sequence 97, 94, 91, 88, 85, 82 using a loop
b) Print out all odd numbers between 1 and 21 (inclusive) using a loop

Nested for Loops

5. What output is produced by the following program? [Do NOT enter it into JGrasp]



```
public class Loops {
    public static void main(String[] args) {
        for (int i = 1; i <= 10; i++) {
            for (int j = 1; j <= 10 - i; j++) {
                System.out.print(" ");
            }
            for (int j = 1; j <= 2 * i - 1; j++) {
                System.out.print("*");
            }
            System.out.println();
        }
    }
}
```

6. Write a static method named `drawFigure` that produces the following output. Use `for` loops to capture the structure of the figure.

```
////////////////\\\\\\\\\\\\\\\\
////////////********\\\\\\\\\\\\
////////****************\\\\\\\\
////************************\\\\
********************************
```

7. Modify your method from the previous exercise so that it uses a class constant for the figure's size. The previous output used a constant size of 5. Here is the output for a constant size of 3:

```
////////\\\\\\\\
////********\\\\
****************
```