CS 103 Lab 4

In this lab you will learn the basics of Java loops, constants and scope of the variables.

Task 1 Loops

Task1.a: In this part you are going to create a for loop and print out the result in every loop. In your main method initialize a variable called x. Set the variable equal to 5. Then, create a for loop which starts from 1 and counts to 10 (10 is included). Now, multiply x variable with the counter of the for loop and print the result to the console.

Example output:

```
5 * 1 = 5
5 * 2 = 10
5 * 3 = 15
5 * 4 = 20
5 * 5 = 25
5 * 6 = 30
5 * 7 = 35
5 * 8 = 40
5 * 9 = 45
5 * 10 = 50
```

You don't have to print the "5 * 1 =" part. You can just print the result.

Task1.b: In this part you are going to create nested loops and print out the result in every loop inner for loop makes. Create a for loop which starts from 1 and counts to 5 (5 is included). Then, inside the brackets of that loop create another for loop which is identical (starts from 1 counts to 5) to the first loop you created. Finally, multiply the counters of these two loops and print the result to the console.

Example output:

```
1 * 1 = 1
1 * 2 = 2
1 * 3 = 3
1 * 4 = 4
1 * 5 = 5

2 * 1 = 2
2 * 2 = 4
2 * 3 = 6
.
.
.
```

Task 2

Task2.a: In this part you going to implement three useful methods. Two for calculating area and circumference of a circle. One for converting degrees to radians. After calculating the result, method should print out the result to the console. Start with creating three methods which are named as "calculateArea", "calculateCircumference" and "convertDegreeToRadian". The formulas for calculating these as follows.

Area of a circle: π * r^2

Circumference of a circle: 2 * π * r

Converting degree to radian: degrees * π / 180

The common point for these formulas is π number, so you should implement it such that all methods can reach to its value. Also, remember that π number is a constant. In addition to π you need to add two more variables as "r" for radius of the circle and "degrees" for degrees to convert radians. For the sake of this task make these two variables available to all methods (hint: the same way you implemented π). You can take π as 3.14. Implement r equal to 5 and degrees to 30. BE CAREFUL ABOUT DATA TYPES.

Example output:

Area: 78.5
Circumference: 31.400000000000002
Radian: 0.5233333333333333

Task2.b: In this part you are going to use the same code you wrote in task2.a to have a better understand of variable scope. Firstly, add one more variable to your code the same way you implemented other variables (available to all methods) and name it as "y". Set it equal to 15. After that, create a method called "changeRadius". Inside this method change "r" 's value to 20. Also create a local variable "y", set it equal to 55 and print "r" and "y" respectively. What is the output? Is "r" equal to 5 or 20. What about "y" is it equal to 15 or 55?

After calling "changeRadius()" from main method, print "y" and "r"? What value for "y" and "r" is printed this time?

Good Luck!