

# COSC 1436: Programming Fundamentals I

## Lab 6: Nested **for** loops

As usual, please submit one source code file (.java file) for each exercise. (Ex. Lab6Ex1.java, Lab6Ex2.java, ... etc).

### Program 1: Multiplication tables (40 points)

You are going to write a program to help elementary students study their multiplication tables.

1. Tell the user that you can print 3 sets of multiplication tables.
2. Read in an input from the user
3. Print a list of multiplication values from 1-9.
4. Repeat the above instructions 2 more times, but updating the number of tables you can print each time

You must use nested for loops for this program. Remember to comment your code.

Below is an example of the program output:

```
I can print 3 more multiplication tables. Which one would you like? 4
4*1=4
4*2=8
4*3=12
4*4=16
4*5=20
4*6=24
4*7=28
4*8=32
4*9=36
I can print 2 more multiplication tables. Which one would you like? 7
7*1=7
7*2=14
7*3=21
7*4=28
7*5=35
7*6=42
7*7=49
7*8=56
7*9=63
I can print 1 more multiplication tables. Which one would you like? 13
13*1=13
13*2=26
```

```
13*3=39
13*4=52
13*5=65
13*6=78
13*7=91
13*8=104
13*9=117
Good luck!
```

```
import java.util.Scanner;
public class Program2{
    public static void main(String[] args){
        Scanner keyboard = new Scanner(System.in);
        int input =0;
        int product=0;
        int counter=0;
        int counter2=0;

        for(counter=3;counter>=1;counter--){
            System.out.print("I can print "+counter+" more multiplication
                tables. Which one would you like?");
            input=keyboard.nextInt();
            for (counter2=1;counter2<10;counter2++){
                product=input*counter2;
                System.out.println(input+"*"+counter2+"="+product);
            }
        }
    }
}
```

## Program 2: Number Triangle (45 points)

Write a program that does the following:

1. Ask user to input a number between 1 and 9.
2. Use for loops to print a number triangle. A number triangle prints a pattern of increasing number series starting from 1 until it reaches the number the user entered. For example, if the user inputs a 4, the output will be:

```
1
12
123
1234
```

Remember that `System.out.println()` prints your message and then goes to the next line, but `System.out.print()` stays on the same line. Thus, if you want to skip to

the next line without printing anything, you can use: `System.out.println("");`

Hint 1: Try doing a number square first and when you get that working, modify it to do a triangle.

Hint 2: Usually, the starting and ending value of a for loop are numbers. However, you can also use a variable. For instance:

```
int counter=0;
int x=0;
x=5;
for(counter=0; counter<x; counter++){
    System.out.println(counter);
}
```

```
import java.util.Scanner;
public class testprog{
    public static void main(String[] args){
        Scanner keyboard = new Scanner(System.in);
        int input =0;
        int product=0;
        int counter=0;
        int counter2=0;

        System.out.print("Please enter a number for a triangle ");
        input=keyboard.nextInt();
        for (counter=1;counter<=input;counter++){
            for(counter2=1;counter2<=counter;counter2++){
                System.out.print(counter2);
            }
            System.out.println("");
        }

    }
}
```

### Exercise 3: Multiple Choice Questions (15 points)

Please enter your answer to the following questions as a comment at the end of Program 2.

1) What is the output of the following program fragment?

```
for(counter=0; counter<3; counter++){  
    for(counter2=1; counter2<4; counter2++){  
        System.out.print(counter + ":" + counter2+ " ");  
    }  
    System.out.println("");  
}
```

- a.     0:1 0:2  
        1:1 1:2  
        2:1 2:2  
        3:1 3:2
- b.     0:0 0:1 0:2 0:3  
        1:0 1:1 1:2 1:3  
        2:0 2:1 2:2 2:3
- c.     0:1 0:2 0:3   1:1 1:2 1:3 2:1 2:2 2:3
- ☒ d.     0:1 0:2 0:3  
        1:1 1:2 1:3  
        2:1 2:2 2:3

2) What is the output of the following program fragment?

```
for(i=3; i>0; i--){  
    for(j=0; j<3; j++){  
        System.out.print(i + "," + j+ " ");  
    }  
}
```

- a.     1,0 1,1 1,2 2,0 2,1 2,2 3,0 3,1 3,2

- ☒ b. 3,0 3,1 3,2 2,0 2,1 2,2 1,0 1,1 1,2
- c. 1,2 1,1 1,0 2,3 2,1 2,0 3,2 3,1 3,0
- d. 3,0 3,1 3,2 3,0 3,1 3,2 3,0 3,1 3,2

3) What is the output of the following program fragment?

```
for(i=1; i<=3; i++){
    for(j=1; j<=3; j++){
        if (i==j){
            System.out.print(i);
        }
        else{
            System.out.print(".");
        }
    }
    System.out.println("");
}
```

- a. 123  
123  
123
- b. 123  
.23  
..3
- ☒ c. 1..  
.2..  
..3
- d. 1  
2  
3