



CSE 215L: Programming Language II Lab

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Lab 03 – Summer 2020

Objective:

After today's lab, the students should be able:

- To follow the loop design strategy to develop loops
- To write programs for executing statements repeatedly using a **while** loop
- To write loops using **do-while** statements and for statements
- To write nested loops
- To implement program control with **break** and **continue**

the while loop	the do-while loop
<pre>while (loop-continuation-condition) { // Loop body Statement(s); }</pre>	<pre>do { // Loop body; Statement(s); } while (loop-continuation-condition);</pre>
the for loop	
<pre>for (initial-action; loop-continuation- condition; action-after-each-iteration) { // Loop body; Statement(s); }</pre>	

Nested loops

Nested loops consist of an outer loop and one or more inner loops. Each time the outer loop is repeated, the inner loops are reentered, and started anew.

```
public class MultiplicationTable {

    public static void main(String[] args) {
        System.out.println(" Multiplication Table");

        System.out.print(" ");
        for (int j = 1; j <= 9; j++)
            System.out.print(" " + j);
        System.out.println("\n-----");
        for (int i = 1; i <= 9; i++) {
            System.out.print(i + " | ");
            for (int j = 1; j <= 9; j++) {
                System.out.printf("%4d", i * j);
            }
            System.out.println();
        }
    }
}
```

Task – 1

(Count positive and negative numbers and compute the average of numbers) Write a program that reads an unspecified number of integers, determines how many positive and negative values have been read, and computes the total and average of the input values (not counting zeros). Your program ends with the input **0**. Display the average as a floating-point number. Here is a sample run:

```
Enter an integer, the input ends if it is 0: 1 2 -1 3 0
The number of positives is 3
The number of negatives is 1
The total is 5.0
The average is 1.25
```

Task – 2

(Financial application: compute future tuition) Suppose that the tuition for a university is \$10,000 this year and increases 5% every year. In one year, the tuition will be \$10,500. Write a program that computes the tuition in ten years and the total cost of four years' worth of tuition after the tenth year.

Task – 3

(Find numbers divisible by 5 or 6, but not both) Write a program that displays all the numbers from 100 to 200, ten per line, that are divisible by 5 or 6, but not both. Numbers are separated by exactly one space.

Task – 4

(Find the factors of an integer) Write a program that reads an integer and displays all its smallest factors in increasing order. For example, if the input integer is **120**, the output should be as follows: **2, 2, 2, 3, 5**.

Task – 5

(Display pyramid) Write a program that prompts the user to enter an integer from **1** to **15** and displays a pyramid, as shown in the following sample run:

```
Enter the number of lines: 7

      1
    2 1 2
  3 2 1 2 3
4 3 2 1 2 3 4
5 4 3 2 1 2 3 4 5
6 5 4 3 2 1 2 3 4 5 6
7 6 5 4 3 2 1 2 3 4 5 6 7
```

Task – 6

(Display numbers in a pyramid pattern) Write a nested **for** loop that prints the following output:

```
      1
    1 2 1
  1 2 4 2 1
1 2 4 8 4 2 1
1 2 4 8 16 8 4 2 1
1 2 4 8 16 32 16 8 4 2 1
1 2 4 8 16 32 64 32 16 8 4 2 1
1 2 4 8 16 32 64 128 64 32 16 8 4 2 1
```

Task – 7

(*Display the first days of each month*) Write a program that prompts the user to enter the year and first day of the year, and displays the first day of each month in the year. For example, if the user entered the year **2013**, and **2** for Tuesday, January 1, 2013, your program should display the following output:

January 1, 2013 is Tuesday

...

December 1, 2013 is Sunday

Task – 8

(*Financial application: compute CD value*) Suppose you put \$10,000 into a CD with an annual percentage yield of 5.75%. After one month, the CD is worth
 $10000 + 10000 * 5.75 / 1200 = 10047.92$

After two months, the CD is worth

$10047.91 + 10047.91 * 5.75 / 1200 = 10096.06$

After three months, the CD is worth

$10096.06 + 10096.06 * 5.75 / 1200 = 10144.44$

and so on.

Write a program that prompts the user to enter an amount (e.g., **10000**), the annual percentage yield (e.g., **5.75**), and the number of months (e.g., **18**) and displays a table as shown in the sample run.

```
Enter the initial deposit amount: 10000
Enter annual percentage yield: 5.75
Enter maturity period (number of months): 18
Month CD Value
1 10047.92
2 10096.06
...
17 10846.57
18 10898.54
```

Task – 9

(*Longest common prefix*) Write a program that prompts the user to enter two strings and displays the largest common prefix of the two strings. Here are some sample runs:

```
Enter the first string: Welcome to C++
Enter the second string: Welcome to programming
The common prefix is Welcome to
```