LAB # 10

Looping Statements (for Loops)

Objective:

1. To work with the for loop
2. To work with nested loops

Theory:

The for Loop

The **for loop** is often used for applications that require a counter. For example, suppose we want to find the average (mean) of the first *n* positive integers. By definition, this means that we need to add 1 + 2 + 3 + . . . + *n* and then divide by *n*. Note this should just give us the value in the "middle" of the list 1, 2, . . . , *n*. Since we know exactly how many times we are performing a sum, the for loop is the natural choice.
The syntax for the for loop is the following:

```
for (initialization; test; update)
{
statement_1; statement_2;
:
statement_n;
}
```

Notice that there are three expressions inside the parentheses of the for statement, separated by semicolons.
1. The **initialization expression** is typically used to initialize a counter that must have a starting value. This is the first action performed by the loop and is done only once.

2. The **test expression**, as with the while and do-while loops, is used to control the execution of the loop. As long as the test expression is true, the body of the for loop repeats. The for loop is a pre-test loop which means that the test expression is evaluated before each iteration.

3. The **update expression** is executed at the end of each iteration. It typically increments or decrements the counter.

Now we are ready to add the first *n* positive integers and find their mean value.

Nested Loops

The placing of one loop inside the body of another loop is called nesting. When you "nest" two loops, the outer loop takes control of the number of complete repetitions of the inner loop. While all types of loops may be nested, the most commonly nested loops are for loops..

Lab Task:

Do task 10.1, 10.2, 10.3 and 10.4 given in file attached on LMS and attach your source code and output window with this file. And write your observation with lab task.

Post Lab:

Write a program that prompts the user for the number of tellers at Nation's Bank in Hyatesville that worked each of the last three years. For each worker the program should ask for the number of days out sick for each of the last three years. The output should provide the number of tellers and the total number of days missed by all the tellers over the last three years.

Sample Run:

How many tellers worked at Nation's Bank during each of the last three years ?
2
How many days was teller 1 out sick during year 1 ?
5
How many days was teller 1 out sick during year 2 ?
8
How many days was teller 1 out sick during year 3 ?
2
How many days was teller 2 out sick during year 1 ?
1
How many days was teller 2 out sick during year 2 ?
0
How many days was teller 2 out sick during year 3 ?
3
The 2 tellers were out sick for a total of 19 days during the last three years

Learning Outcomes:

Upon successful completion of the lab, students will be able to:

LO1: To work with looping and nested looping statements using for loops.