

LAB 07

Summary

Items	Description
Course Title	Programming Fundamentals
Lab Title	Operators in C++
Duration	3 Hours
Operating System/Tool/ Language	Ubuntu/ g++/ C++
Objective	To get familiar with use of for loop

In computer programming, loops are used to repeat a block of code.

A loop is used for executing a block of statements repeatedly until a particular condition is satisfied. For example, when you are displaying number from 1 to 100 you may want set the value of a variable to 1 and display it 100 times, increasing its value by 1 on each loop iteration instead of writing the print statement 100 times.

There are 3 types of loops in C++.

- for loop
- while loop
- do...while loop

For Loop:

A for loop is a repetition control structure that allows you to efficiently write a loop that needs to execute a specific number of times.

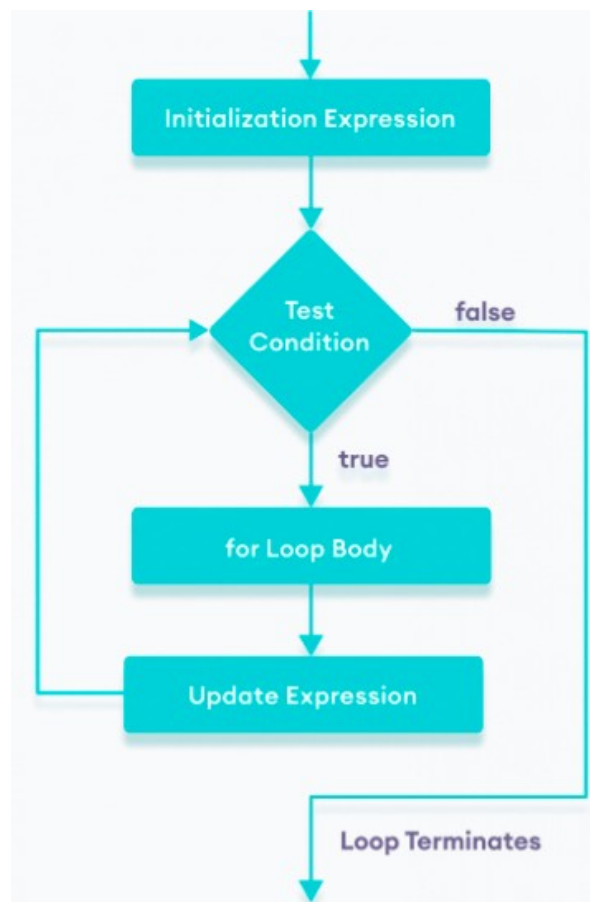
The syntax of for-loop is:

```
for (initialization; condition; increment) {  
    // body of-loop  
}
```

Here is an explanation of the above parameters:

- **Initialization:** This part is executed first and only once. Here, you declare and initialize loop control variables. The loop control variables can be more than one, and their values will change after every iteration. However, their values must be evaluated before an iteration runs.
- **Condition:** This part is executed next. For the loop body to be executed, this condition must be true. If the condition is false, execution will jump to statements immediately after the loop body. If the condition is false on the first evaluation, the loop body will never be executed.
- **Increment:** Once the loop body has been executed, control jumps to the increment. You can leave out this part and use a semicolon instead.
- Again, the condition is evaluated. If it's true, the loop body is executed, and this continues. The loop terminates immediately the condition becomes false.

Flowchart of For loop:





Example 7.1:

Display numbers from 1 to 5

```
#include <iostream>

using namespace std;

int main() {
    for (int i = 1; i <= 5; ++i) {
        cout << i << " ";
    }
    return 0;
}
```

Output

```
1 2 3 4 5
```

Example 7.2:

Display "Hello world" 5 times.

```
// C++ Program to display a text 5 times

#include <iostream>

using namespace std;

int main() {
    for (int i = 1; i <= 5; ++i) {
        cout << "Hello World! " << endl;
    }
    return 0;
}
```

Output

```
Hello World!
Hello World!
Hello World!
Hello World!
Hello World!
```



Example 7.3:

Find the sum of first n Natural Numbers.

```
// C++ program to find the sum of first n natural numbers
// positive integers such as 1,2,3,...n are known as natural numbers

#include <iostream>

using namespace std;

int main() {
    int num, sum;
    sum = 0;

    cout << "Enter a positive integer: ";
    cin >> num;

    for (int i = 1; i <= num; ++i) {
        sum += i;
    }

    cout << "Sum = " << sum << endl;

    return 0;
}
```

Output

```
Enter a positive integer: 10
Sum = 55
```



Lab Tasks

Task#01

Write a C++ program to print the following:

The Prophet (Sallallahu Alayhi Wa Sallam) said:

"Lying is wrong, except in three things: the lie of a man to his wife to make her content with him; a lie in war, for war is deception; or a lie to settle trouble between people."

[Ahmad, 6.459. H].

Tsk#02

Use for loop:

Write a C++ program using the for loop to find the sum of the even integers 2,4,6,8,...,500. Display the resulting sum and average.

Output:

```
Print sum of even numbers till : 500
Sum of even numbers from 1 to 500 is : 62750
Averag of even numbers from 1 to 500 is : 251
```

Task#03

In mathematics, the factorial of a positive integer n , denoted by $n!$, is the product of all positive

integers less than or equal to n . For Example

$$5! = 5 \times 4 \times 3 \times 2 \times 1$$

Write a program using FOR loop that can compute factorial of an integer entered by user.

If the

number is less than zero display "invalid Input" else display the resulted factorial.

Note : $0! = 1$

Output:



```
hp@hp-HP-15-Notebook-PC:~/Desktop/FAST Job/PF/Lab7 G1$ ./p
Enter a positive integer: 5
Factorial of 5 = 120
hp@hp-HP-15-Notebook-PC:~/Desktop/FAST Job/PF/Lab7 G1$ ./p
Enter a positive integer: 0
Factorial of 0 = 1
hp@hp-HP-15-Notebook-PC:~/Desktop/FAST Job/PF/Lab7 G1$ ./p
Enter a positive integer: -9
Error! Factorial of a negative number doesn't exist.
```

Task#04

Create a program to find whether the number entered by user is prime or not? Prime number is a number which is only divisible by 1 and itself.(1,3,5,7,11,13.....)

Sample output:

Enter a number? 11

you have entered a prime number

Task#05

Write a program to print the table of a number entered by user using for loop.

Sample output:

Enter a number? 3

3x1=3

3x2=6

3x3=9

.....

3x12=36

Task#06

Create a program which take 10 values from user using for loop your program should count the total number of positive numbers, total number of negative numbers and total number of zeros.

Task#07

Write a program to fill the entire screen with a smiling face. The smiling face has an ASCII value 1.

Task#08

Write a program to print out all Armstrong numbers between 99 and 999. If sum of cubes of each digit of the number is equal to the number itself, then the number is called an Armstrong number.

For example, $153 = (1 * 1 * 1) + (5 * 5 * 5) + (3 * 3 * 3)$

Practice Question:
Run all sample programs

Submission Instructions:
Please submit a pdf file, having your code as well as output screenshot.
Don't forget to rename your file.
