



Programming Fundamentals (Lab 2019)



Lab Manual

Computer Science for Session 2019 (Fall-2019)

Programing Fundamentals

This course is a comprehensive introductory course that is intended for students who have no background in computer programming. The aim of this course is to provide students with a firm foundation of “Basics of Programing Fundamentals” and to make them able to design C++ code of algorithms. The aim is to provide foundation of programing and to polish the skills of understanding computational problems in algorithmic way. The programming language used in this programming course is C++.

Instructor: Ms. Sahar Waqar

Graduate Assistant: Mr. Muhammad Nazam Maqbool, Mr. Usman Ghani



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Programming Fundamentals

(Lab 5)

Target: While Loop(Flow Charts and C++ Programs)

i) **Guidelines/Instructions:**

- Please follow indentation to avoid readability problems. Add brackets to avoid unexpected logical errors.
- Plagiarism/Cheating is highly discouraged by assigning 0 to both who tried and one who shared his/her code.
- Contact your teacher and GAs during their office hours (mentioned at end of lab). Feel free to email us with subject as 'Query | 2019-CW-XYZ' | Issue'. Add details in content of email.

i) **Reading/Helpful Material:**

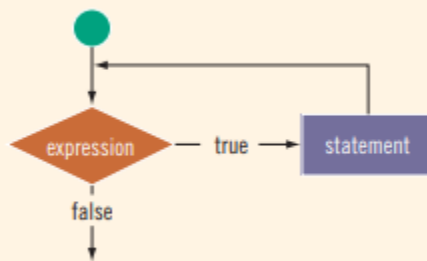
- **Consult Chapter No 5 of book "C++: Programming from Problem Analysis to Program Design by D.S Malik (latest edition)" for better understanding of given problems.**
- C++ Loops: (<https://beginnersbook.com/2017/08/cpp-do-while-loop/>)
- C++ Loops examples: (<https://codeforwin.org/2015/06/for-do-while-loop-programming-exercises.html>)

ii) **Tasks to be completed in lab:**

// **Example program 1(While LOOP).**

Syntax:

```
while (condition) {  
    // code block to be executed  
}
```



Program 1:

```
#include <iostream>  
using namespace std;  
int main()  
{
```

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```
int i = 0;
while (i < 5)
{
    cout << i << "\n";
    i++;
}
```

Program 2:

```
#include<iostream>
using namespace std;

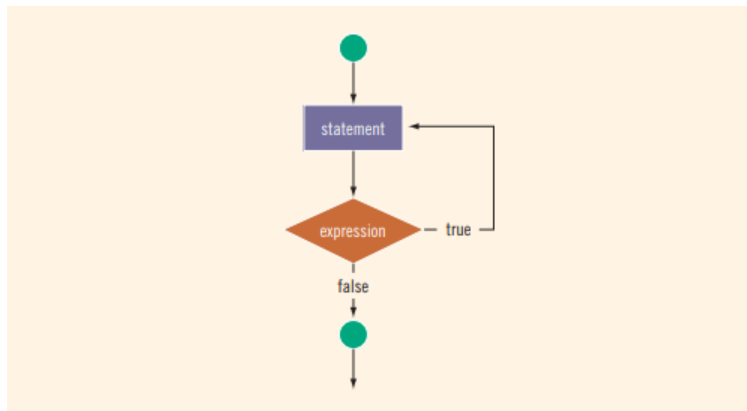
int main() {
    // Variable Declaration
    int a;

    // Get Input Value
    cout << "Enter the Number :";
    cin >> a;

    int counter = 1;
    //while Loop Block
    while (counter <= a) {
        cout << "Execute While " << counter << " time" << endl;
        counter++;
    }

    return 0;
}
```

Do/While Loop:



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```
do
{
    statement
}
while (expression);
```

Program 3:

```
#include <iostream>
using namespace std;
int main()
{
    int num=1;
    do
    {
        cout<<"Value of num: "<<num<<endl;
        num++;
    }while(num<=6);

    return 0;
}
```

Tasks to do in Lab:

Note: Develop logic on paper and then start writing your code. There is no formula involved in any of the following questions. Logic creation is the task of the programmer. If you are having trouble developing it, use paper and think how you will solve the problem without computer. Enlist the steps and make sure the sequence of steps takes you to the solution of the problem. Once you have finalized the steps, translate your steps into C++. Also, do not develop logic with friends or see their code. This will not help in exercising your brain. Eventually, it will make you lose your confidence of developing programs on your own. More practice, better results.

1. Write a C++ program that finds the sum of the first n positive integers using do while loop and while loop. For example, if user enters 3 then output will be $1+2+3 = 6$.
2. Write a C++ program to print the multiplication table of a number 'n' up to 10 rows using while loop. For example, if user enters 5 then you must print table of 5 up to 10 rows i.e. $5 \times 1 = 5$ $5 \times 10 = 50$.
3. Write a C++ program to print all the even numbers from 1 to certain number entered by user. For example, if user enters 10 then output will be 2, 4, 6, 8, 10.
4. Write a C++ program to count total digits in each integer using while loop. For example, if user enters 5678 then output will be 4.
5. Write C++ program to calculate the factorial of number and ask user to enter Y if he wants to try another number or N if he wants to terminate the program. For example, if user enters 4 then output of the program will be $4*3*2*1 = 24$ and user will be asked to type "Y/N". If user enters Y, then you will again ask for 'n' and recalculate the factorial. You will keep on doing it until users enters 'N'. If user enters 'N', program should exit.
6. Write a C program to find Highest Common Factor (HCF/ GCD) of two numbers. For example, if user enters 4 and 64 then greatest common divisor (GCD) for the given values will be 4.

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iii) Tasks to be submitted:

1. Write a C++ program to find Least Common Multiple (LCM) of two numbers. For example, if user enters 2 and 5 then LCM of the values will be 10.
2. Write a C++ program to check whether a number is prime number or not. For example, if user enters 2 then output of the program is “Prime”. If user enters 1024 then output is “Not Prime”.
3. Write a C++ program to print all prime numbers between 1 to n. For example, if user enters n = 10 then output of the program will be “2, 5, 7”.
4. Write a C++ program to find sum of all prime numbers between 1 to n. For example, if user enters n = 10 then output of the program will be $2+5+7 = 14$.
5. Write a C++ program to find all prime factors of a number. For example, if user enters 28 then output of the program is “2, 7”.
6. Write a C++ program, which takes ‘n’ as input and print a pattern with n lines using while loops. For example, if user enters 6 then output of the program is shown below:

```
*
**
***
****
*****
*****
```

1. Submission instructions:

- Same instructions as shared in earlier labs will be followed for lab submission.

V) Office hours and email address for communication:

- Ms. Sahar Waqar (Teacher)
 - ✚ Email: sahar.waqar@uet.edu.pk
 - ✚ Office hours:
 - Tuesday (**Fixed**): 11:00 pm to 12:45 pm
 - Wednesday (Variable): 11:00 am to 1:00 pm (May change due to meetings)
 - Wednesday (**Fixed**): 1:00 pm to 3:00 pm
- Mr. Usman Ghani (Graduate assistant)
 - ✚ Email:
 - ✚ Office hours:
- Mr. Muhammad Nazam Maqbool (Graduate assistant)
 - ✚ Email: ashirmaqbool1611@gmail.com
 - ✚ Office hours:

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