

# National University of Computer and Emerging Sciences



## Lab Manual *for* Programming Fundamentals

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## Objectives:

### In this lab we will learn

- Control Structures
  - while loops
  - For loops
  - Do While
- File Handling

## Reference:

```
while (expression)
    statement
```

```
for (initial statement; loop condition; update statement)
    statement
```

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

## Practice Questions:

**Q1)** What is the output of following code?

```
a = 3;  b = 0;
while (a+b < 6)
{
    b = 0;
    while (b < 4)
    {
        cout<<b<<endl;
        b = b+2;
    }
    a = a - 1;
}
```

**Q2)** Consider the following C++ program segment:

```
i = 20;                //Line 1
while (i < 20)          //Line 2
{                      //Line 3
    cout << i << " ";  //Line 4
    i = i + 5;         //Line 5
}                      //Line 6
cout << endl;         //Line 7
```

**Q3)** Consider the following for loop:

```
for (i = 1; i <= 5; i++)
{
    cout << "Hello!" << endl;
    cout << "*" << endl;
}
```

Consider the following for loop:

```
for (i = 1; i <= 5; i++)
    cout << "Hello!" << endl;
    cout << "*" << endl;
```

**Q4)** Consider the following `for` loop:

```
for (i = 1; i <= 10; i++);           //Line 1
    cout << i << " ";               //Line 2
cout << endl;                        //Line 3
```

**Q5)** Consider the following `for` loop:

```
for (i = 10; i <= 9; i++)
    cout << i << " ";
cout << endl;
```

**Q6)** Consider the following `for` loop:

```
for (i = 9; i >= 10; i--)
    cout << i << " ";
cout << endl;
```

**Q7)** Consider the following `for` loop:

```
for (i = 1; ; i++)
    cout << i << " ";
cout << endl;
```

**Q8)** Consider the following `for` loop:

```
for (i = 2; i < 100; i = 2 * i)
    cout << i << " ";
cout << endl;
```

**Q9)** Consider the following `do-while` loop:

```
i = 0;

do
{
    cout << i << " ";
    i = i + 5;
}
while (i <= 20);
```

### Q10) For Loop Practice question:

The following C++ program finds the sum of the first n positive integers.

//Program to determine the sum of the first n positive numbers.

```
#include <iostream> //Line 1

using namespace std; //Line 2

int main() //Line 3
{ //Line 4
    int counter; //loop control variable Line 5
    int sum; //variable to store the sum of numbers Line 6
    int N; //variable to store the number of
           //first positive integers to be added Line 7

    cout << "Line 8: Enter the number of positive "
           << "integers to be added: "; //Line 8
    cin >> N; //Line 9
    sum = 0; //Line 10
    cout << endl; //Line 11

    for (counter = 1; counter <= N; counter++) //Line 12
        sum = sum + counter; //Line 13

    cout << "Line 14: The sum of the first " << N
           << " positive integers is " << sum
           << endl; //Line 14

    return 0; //Line 15
} //Line 16
```

**Sample Run:** In this sample run, the user input is shaded.

Line 8: Enter the number of positive integers to be added: 100

Line 14: The sum of the first 100 positive integers is 5050

**Q11) File Handling Practice Question:**

```
#include <iostream>
#include <fstream>
using namespace std;
int main() {
    ifstream fin;
    ofstream fout;

    string letter;

    fout.open("OutputFile.txt");
    fout << "Hello my name is shahzaib";

    fout.close();
    fin.open("OutputFile.txt");
    while (!fin.eof())
    {
        fin >> letter;

        cout << "\n\n" << letter;
    }

    fin.close();
    return 0;
}
```

## Problems:

### Problem 1: (Marks 10)

Using nested for loops, take input from the user and print the multiplication table:

Example:

Input: 6

Output:

1*	1	2	3	4	5	6
2*	2	4	6	8	10	12
3*	3	6	9	12	15	18
4*	4	8	12	16	20	24
5*	5	10	15	20	25	30
6*	6	12	18	24	30	36

### Problem 2: (Marks 5+5)

1. Write a program, which reads 20 integer values from a file and store all the even values read from the input file to an output file. The format of files is shown below.

Input file

12
34
17
16
4
23
2
44

Output file

The even values are
12
34
16
4
2
44
22

2. Update the program to read any number of values from the input file. That is the program should keep on reading values from the file until the end of file is reached. You are supposed to use the **eof()** operation to check end of file.