

National University of Computer and Emerging Sciences



Lab Manual # 6

Programming Fundamentals

(Section BSE- IA)

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Section	BSE-1A
Semester	Fall 2021

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Lab Manual

Objectives

The objectives of this lab are to cover the following:

- do-while loop (page 284 of textbook)
- nested loops (page 291 of textbook)
- user-defined functions (page 320 of textbook)

Exercise 1 (do-while loop):

The greatest common divisor (GCD) of two integers is the largest integer that evenly divides each of the numbers. Write a C++ program that gives the greatest common divisor of two positive integers. Take these two numbers from the user.

Remember that the GCD of two numbers can be computed using Euclidean Algorithm as follows

Euclidean Algorithm Demo:

$$\begin{array}{r} 2 \\ 252 \overline{) 735} \\ \underline{504} \\ 231 \end{array} \rightarrow \begin{array}{r} 1 \\ 231 \overline{) 252} \\ \underline{231} \\ 21 \end{array} \rightarrow \begin{array}{r} 11 \\ 21 \overline{) 231} \\ \underline{21} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

$$\text{GCD}(252, 735) = 21$$

Sample Run:

Input num1: 252

Input num2: 735

Output

GCD: 21

Exercise 2 (nested loops):

Write a C++ program that displays the following pattern:

For user input *Starting Number = 5* and *Rows = 6*, output should be:

```
5 * 6 * 7 * 8 * 9 * 0 *  
1 * 2 * 3 * 4 * 5 *  
6 * 7 * 8 * 9 *  
0 * 1 * 2 *  
3 * 4 *  
5 *
```

Note: Code should be generic i.e. it should run for any starting number ranging from 0 to 9 and any row number.

Exercise 3 (user-defined functions):

Write a function in C++ that takes two numbers as parameters from the user and then returns their sum. It should be called from main method as follows:

```
int main()  
{  
    int num1, num2, sum;  
    cin>>num1>>num2;  
    sum= Addition(num1, num2); // function to implement  
  
    cout<<"Sum was "<<sum<<endl;  
    return 0;  
}
```