

# National University of Computer and Emerging Sciences



## Lab Manual # 5

### Programming Fundamentals

#### (Section BSCS-1G)

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# Lab Manual

## Objectives

The objectives of this lab are to cover the following:

- while loop (page 249 of textbook)
- for loop (page 273 of textbook)

## Exercise 1 (while loop):

Write a C++ program that keep taking input numbers from user and terminate the program when user enters -1. Your task is to add all those numbers before -1.

### Sample Run

Enter your numbers:

2  
5  
7  
1  
5  
-1

### Output

Sum is 20

- - - - -

## Exercise 2 (While):

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:

The diagram illustrates the steps of the Euclidean Algorithm for finding the GCD of 252 and 735. It shows three long division problems connected by arrows. The first step is 252 dividing 735 with a quotient of 2 and a remainder of 231. A red arrow points to the second step, which is 231 dividing 252 with a quotient of 1 and a remainder of 21. A green curved arrow points from the remainder 231 of the first step to the divisor 231 of the second step. A second red arrow points to the third step, which is 21 dividing 231 with a quotient of 11 and a remainder of 0. The divisor 21 in the third step is circled in red.

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

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

**Sample Run:**

**Input num1:** 252

**Input num2:** 735

**Output**

**GCD:** 21

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### Exercise 3 (for loop):

Write a program in C++ that will ask to user how many digits number you will enter then display the input number in reverse order

#### Sample Output:

Input a number: 12345

The number in reverse order is: 54321

### Exercise 4:

Write a program that calculates the occupancy rate for a hotel. The program should start by asking the user how many floors the hotel has. A loop should then iterate once for each floor. In each iteration, the loop should ask the user for the number of rooms on the floor and how many of them are occupied. After all the iterations, the program should display how many rooms the hotel has, how many of them are occupied, how many are unoccupied, and the percentage of rooms that are occupied. The percentage may be calculated by dividing the number of rooms occupied by the number of rooms.

**NOTE:** It is traditional that most hotels do not have a thirteenth floor. The loop in this program should skip the entire thirteenth iteration.