



## **Programming Fundamental (CS111)**

### **Assignment # 01**

[CLO-2, Taxonomy Level-C3, PLO-2]

**Course:** BSCS-1

**Semester:** 1<sup>st</sup> (Fall 2023)

**Due Date:** 27/10/2023

**Total Marks:** 30

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### **Instructions**

1. *Plagiarism, copy & past material will lead to the cancellation of your assignment.*
  2. *Write your Name, Reg# on the first page (title page) of your submission.*
  3. *No late submission*
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In C++ programming, data types provide the foundation for storing and manipulating information, while operators allow us to perform operations on that data. Control structures, such as selection (if-else) and repetition (loops), enable us to create structured and dynamic program logic. Together, these fundamental building blocks empower developers to create robust and efficient C++ programs. Understanding and mastering these fundamentals is essential for proficient C++ programming.

**Q.1 Implement** each of the following scenarios in the C++ program by utilizing, the Datatypes, operators, and control structure. (the code must have proper indentation and comments)  
(Mark: 5+ 8+10+10)

1. A program that takes two fractions (in the form of a/b and c/d) and displays their sum in fraction form. The output will look like

Please enter the first fraction: 1/2

Please enter the second fraction: 2/5

Result: 1/2+2/5 = 9/10

2. Develop a program that takes as input any change expressed in Rupees(PKR). It should then compute the number of 100Rs Notes, 50Rs Notes, 20Rs Notes, and 10Rs Notes to be returned, returning as many 100Rs notes as possible, then 50Rs, 20Rs, and 10Rs that order. For example, 260 Rs should be returned as two 100Rs notes, one 50Rs note, and one 10Rs note.

3. You need to develop a computer program that calculates a customer's bill for a local Cable TV company. There are two types of customers: members and non-members. There are two different rates for calculating a bill: one for members and one for non-members. The following rates will be applied:

Membership holder:

- Bill processing fee: 100 PKR
- Basic Service fee: 200 PKR
- Premium channels: 50 PKR per channel

Non-Member

- Bill processing fee: 150 PKR
- Basic Service fee: 300 PKR
- Premium channels: 80 PKR per channel

The program should ask the user for an account number (an integer) and a customer code. Assume that M stands for a member, and N stands for non-member.

4. In mathematics, the notation  $n!$  represents the factorial of the nonnegative integer  $n$ . The factorial of  $n$  is the product of all the nonnegative integers from 1 to  $n$ . Write a program that lets the user enter a nonnegative integer and then uses a loop to calculate the factorial of that number. Display the factorial.
5. 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.

Input Validation: Do not accept a value less than 1 for the number of floors. Do not accept a number less than 10 for the number of rooms on a floor.