**COMSATS University Islamabad**

**Attock Campus**Department of Electrical and Computer Engineering

**Program:** BCE-4 Spring 2021

**Lab Sessional I  
Course:** Object Oriented Programming

**Time Allowed: 1h 15min Marks: 30**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Reg. No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Note:** Each question carries 15 marks

**Instructor’s E-mail id**: [laraib@cuiatk.edu.pk](mailto:laraib@cuiatk.edu.pk)

**Instructions:**

1. You have to submit your answer document & code file via both MS Teams & email.
2. Save document file with your Name and Registration number.
3. No late answers would be accepted.

**Question 1: [CLO-2,4]**

In ocean navigation, locations are measured in degrees and minutes of latitude and longitude. These locations are represented as 149 degrees 34.8 minutes west longitude, and 17 degrees 31.5 minutes south latitude. This is written as 149°34.8’ W, 17°31.5’ S. There are 60 minutes in a degree. Longitude is measured from 0 to 180 degrees, east or west from Greenwich. Latitude is measured from 0 to 90 degrees, north or south from the equator to the poles.

Create a **class angle** that includes three member variables: an int for degrees, a float for minutes, and a char for the direction letter (N, S, E, or W). This class can hold either a latitude variable or a longitude variable. Write one member function to obtain an angle value (in degrees & minutes) and a direction from the user, and a second to display the angle value in **“**179°59.9’E**”** format. Also write a three-argument constructor. Write a main() program that displays an angle initialized with the constructor, and then, within a loop, allows the user to input any angle value, and then displays the value.

Hint: You can use the hex character constant ‘\xF8’ , which usually prints a degree (°) symbol.

**Question 2: [CLO-3,4]**

Create the equivalent of a **four-function calculator**. The program should ask the user to enter a number, an operator, and another number. It should then carry out the specified arithmetical operation: adding, subtracting, multiplying, or dividing the two numbers using operator overloading. Use a switch statement to select the operation. Finally, display the result.

When it finishes the calculation, the program should ask whether the user wants to do another calculation. The response can be ‘y’ or ‘n’. Some sample interaction with the program might look like this:

Enter first number, operator, second number: 10 / 3

Answer = 3.333333

Do another (y/n)? y

Enter first number, operator, second number: 12 + 100

Answer = 112

Do another (y/n)? n