LAB 06: Control Structures (if/if-else/if-else-if)

Objective(s): Upon completion of this lab session, learners will be able to:
CLOs: CL01, CLO4

Apply if –else decision statements in C++ Understand basic and relational operators used in C++

Introduction:
A program is usually not limited to a linear sequence of instructions. Normally, statements in a program execute one after the other in the order in which they're written. This is called sequential execution. Various C++ statements we'll soon discuss enable you to specify that *the next statement to execute may be other than the next one in sequence*. This is called transfer of control. C++ provides control structures that serve to specify what has to be done by our program, when and under which circumstances. The instructions in the program can be organized in three kinds of control structures.
If Statement
If/else Statement
Else if
If Statement:
The if statement can cause other statements to execute only under certain conditions. General format of the if statement
:

if (*expression*) *statement*;

Example 1:

```
 // This program averages 3 test scores.
#include <iostream>
#include <iomanip>
using namespace std;
int main() {
        int score1, score2, score3;
        double average;
        cout << "Enter 3 test scores and I will average them: ";
        cin  >> score1 >> score2 >> score3;
        average = (score1 + score2 + score3) / 3.0;
        cout << fixed << setprecision(1);
        cout << "Your average is " << average << endl;
```

```
        if (average == 100)
        {
                cout << "Congratulations! ";
                cout << "That's a perfect score!\n";
        }
        return 0;
}
```

Program Output

Program Output with Example Input Shown in Bold
Enter 3 test scores and I will average them: 80 90 70 [Enter]
Your average is 80.0
Program Output with Different Example Input Shown in Bold
Enter 3 test scores and I will average them: 100 100 100 [Enter]
Your average is 100.0
Congratulations! That's a high score!

If / else statement:

The if/else statement will execute one group of statements if the expression is true, or another group of statements if the expression is false. The if/else statement is an expansion of if statement. Here is its format:

```
if (expression)
statement or block
else
statement or block
```

Example:

```
// this program uses an if/else if statement to assign a
// letter grade (A, B, C, D, or F) to a numeric test score.
#include <iostream>
using namespace std;
int main()  {
        int testScore;
        char grade;
        cout << "Enter your numeric test score and I will\n";
        cout << "tell you the letter grade you earned: ";
        cin  >> testScore;
        if (testScore < 60)
                grade = 'F';
        else if (testScore < 70)
                grade = 'D';
        else if (testScore < 80)
                grade = 'C';
        else if (testScore < 90)
                grade = 'B';
```

```
        else if (testScore <= 100)
                grade = 'A';
        cout << "Your grade is " << grade << ".\n";
        return 0;
}
```

Program Output:
Enter your numeric test score and I will tell you the letter grade you earned: 88[Enter] Your grade is B.

Lab Tasks:

Task 1

Write a C++ Program that read an alphabet (e.g. a,b,c,d,…..z) and display whether the input alphabet is a vowel (i.e. a, e, i, o, u) or consonant.

Task 2

Write a program that asks the user to enter two numbers. The program should use the conditional operator to determine which number is the smaller and which is the larger.

Task 3

Write a C++ Program that read an integer input in between (1 to 12) and store it month_of_year. Print the corresponding month of year. Use else if statement.

Example: Input is 4… Print "April"

Task 4

(Body Mass Index Calculator)

The formulas for calculating, BMI is,

BMI = weight In Pounds x 703 / (height Inches x height Inches)

Create a BMI calculator application that reads the user's weight in pounds and height in inches (or, if you prefer, the user's weight in kilograms and height in meters), then calculates and displays the user's body mass index. The user can evaluate his/her BMI:

Values:

Underweight	Less 18.5
Normal	Between 18.5 and 24.9
Overweight	Between 25 and 29.9
Obese	30 or greater

Task 5

Write a C++ Menu driven program that allows a user to enter 2 numbers and then choose between findings the sum, subtraction, division, multiplication or average. Use else if statement to determine what action to take.