LAB MANUAL 01

NAME: M. Amaan Raza

Qalam id: 465416

CLASS: ME 15 C

LAB MANUAL 01

HOME TASKS

HOME TASK 01

Q 1 Write a C++ program to calculate distance between two points. The values of coordinates should be input by user.

D=(x2-x1) ^2+ (y2-y1) ^2

ANS

```cpp
#include <iostream>
using namespace std;

int main () {
    // Declare variables to store the coordinates of two points
    int x1, y1, x2, y2;

    // Request the user to enter the x and y coordinates for the first point
    cout << "Enter the x coordinates of the first number: ";
    cin >> x1;
    cout << "Enter the y coordinates of the first number: ";
    cin >> y1;

    // Request the user to enter the x and y coordinates for the second point
    cout << "Enter the x coordinates of the second number: ";
    cin >> x2;
    cout << "Enter the y coordinates of the second number: ";
    cin >> y2;

    // Calculate the differences in x and y coordinates
    int dX = x2 - x1;
    int dY = y2 - y1;

    // Calculate the square of the distance between the two points
    int distance = (dX * dX) + (dY * dY);

    // Display the calculated distance
    cout << "The distance between two points is: " << distance << endl;

    return 0;
}
```

Output

```
Enter the x coordinates of the first number: 7
Enter the y coordinates of the first number: 8
Enter the x coordinates of the second number: 8
Enter the y coordinates of the second number: 9
The distance between two points is: 2

--------------------------------
Process exited after 9.558 seconds with return value 0
Press any key to continue . . .
```

Q 2 Write a code in C++ to take length from user in centimeter and convert it into meter and kilometer.

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare variables to store length in centimeters, meters, and kilometers
    double lengthincm, lengthinm, lengthinkm;

    // Request the user to enter the length in centimeters
    cout << "Enter length in cm: ";
    cin >> lengthincm;

    // Convert length from centimeters to meters (1 meter = 100 centimeters)
    lengthinm = lengthincm / 100;

    // Convert length from centimeters to kilometers (1 kilometer = 100,000 centimeters)
    lengthinkm = lengthincm / 100000;

    // Display the length in meters and kilometers
    cout << "Length in meters: " << lengthinm << endl;
    cout << "Length in kilometers: " << lengthinkm << endl;

    return 0;
}
```

Output

```
Enter length in cm: 456777
Length in meters: 4567.77
Length in kilometers: 4.56777

--------------------------------
Process exited after 5.733 seconds with return value 0
Press any key to continue . . .
```

Q 3 Write a code in C++ that takes values of a and b from the user and displays result of polynomial a ^ 2 + 2ab + b ^ 2.

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare variables to store values of 'a', 'b', and the result of the polynomial
    double a, b, result;

    // Request the user to input the value of 'a'
    cout << "Input value of a: ";
    cin >> a;

    // Request the user to input the value of 'b'
    cout << "Input value of b: ";
    cin >> b;

    // Calculate the result of the polynomial (a^2 + 2ab + b^2)
    result = (a * a) + (2 * a * b) + (b * b);

    // Display the result of the polynomial
    cout << "Result of the polynomial: " << result << endl;

    return 0;
}
```

Output

```
Input value of a: 8
Input value of b: 1
Result of the polynomial: 81

--------------------------------
Process exited after 5.786 seconds with return value 0
Press any key to continue . . .
```

Q 4 Write a program in C++ to convert temperature in Fahrenheit to Celsius.

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare variables to store temperature in Fahrenheit and the result in Celsius
    double fahrenheit, result;

    // Request the user to input the temperature in Fahrenheit
    cout << "Temperature in Fahrenheit: ";
    cin >> fahrenheit;

    // Convert the temperature from Fahrenheit to Celsius using the formula (F - 32) * 5/9
    result = (fahrenheit - 32) * 5/9;

    // Display the temperature in Celsius
    cout << "Temperature in Celsius: " << result << endl;

    return 0;
}
```

Output

```
Temperature in Fahrenheit: 42.8
Temperature in Celsius: 6

--------------------------------
Process exited after 10.2 seconds with return value 0
Press any key to continue . . .
```

LAB MANUAL 02

LAB TASKS

Lab task

Q 1 Write a program that determines if a person is eligible to vote based on their age (e.g.,

18 years or older) using logical operators.

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare a variable to store the user's age
    int age;

    // Requeat the user to enter their age
    cout << "Please enter your age: ";
    cin >> age;

    // Check if the age is greater than or equal to 18
    if (age >= 18) {
        // Display a message indicating eligibility to vote if the condition is met
        cout << "You are eligible to vote ";
    } else {
        // Display a message indicating ineligibility to vote if the condition is not met
        cout << "You are not eligible to vote ";
    }

    return 0;
}
```

Output

```
Please enter your age: 19
You are eligible to vote
--------------------------------
Process exited after 17.16 seconds with return value 0
Press any key to continue . . .
```

Q 2 Write a program that takes an integer as input and checks if it falls within the range [10,

50] using logical operators

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare a variable to store the user's integer input
    int integer;

    // Request the user to enter an integer
    cout << "Please enter an integer: ";
    cin >> integer;

    // Check if the entered integer is within the range [10, 50]
    if (integer >= 10 && integer <= 50) {
        // Display a message if the integer is within the range
        cout << "The number is within the range [10, 50].";
    } else {
        // Display a message if the integer is not within the range
        cout << "The number is not in the range [10, 50].";
    }

    return 0;
}
```

Output

```
Please enter an integer: 56
The number is not in the range [10, 50].
--------------------------------
Process exited after 7.982 seconds with return value 0
Press any key to continue . . .
```

Q 3Write a C++ program to compare two integers and find the maximum value

ANS

```cpp
#include<iostream>
using namespace std;

int main() {
    // Declare variables to store two numbers
    int num1, num2;

    // Request the user to enter the first number
    cout << "Enter the first number: ";
    cin >> num1;

    // Request the user to enter the second number
    cout << "Enter the second number: ";
    cin >> num2;

    // Compare the two numbers to determine the maximum
    if (num1 > num2) {
        // Display the maximum number if num1 is greater
        cout << "The maximum number is: " << num1 << endl;
    } else if (num1 < num2) {
        // Display the maximum number if num2 is greater
        cout << "The maximum number is: " << num2 << endl;
    } else {
        // Display a message indicating that both numbers are equal
        cout << "Both numbers are equal" << endl;
    }

    return 0;
}
```

Output

```
Enter the first number: 8
Enter the second number: 5
The maximum number is: 8

--------------------------------
Process exited after 8.794 seconds with return value 0
Press any key to continue . . .
```

Q 4 Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average >= 60)

ANS

```cpp
#include<iostream>
using namespace std;

int main() {
    // Declare variables to store three exam scores and the average
    int e1, e2, e3, average;

    // Request the user to enter the first exam score
    cout << "Enter the first score: ";
    cin >> e1;

    // Request the user to enter the second exam score
    cout << "Enter the second score: ";
    cin >> e2;

    // Request the user to enter the third exam score
    cout << "Enter the third score: ";
    cin >> e3;

    // Calculate the average score by taking sum of all numbers and dividing by '3'
    average = (e1 + e2 + e3) / 3;

    // Check if the average score is greater than or equal to 60
    if (average >= 60) {
        // Display a message indicating that the student has passed
        cout << "You are pass";
    } else {
        // Display a message indicating that the student has failed
        cout << "You are fail";
    }

    return 0;
}
```

Output

```
Enter the first score: 67
Enter the second score: 45
Enter the third score: 23
You are fail
--------------------------------
Process exited after 17.43 seconds with return value 0
Press any key to continue . . .
```

Home Task

Q 1 Create a program that takes a student's score as input and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F). A-Grade: 90-100 Marks B-Grade: 75-90 Marks C-Grade: 60-75 Marks D-Grade: 45-60 Marks F-Grade: 0-45 Marks

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare a variable to store the student's score
    int score;

    //Request the user to enter their score
    cout << "Enter your score: ";
    cin >> score;

    // Check the score against various grade ranges
    if (score >= 90 && score <= 100) {
        // Display Grade A if the score falls within this range
        cout << "Grade A" << endl;
    } else if (score >= 75 && score < 90) {
        // Display Grade B if the score falls within this range
        cout << "Grade B" << endl;
    } else if (score >= 60 && score < 75) {
        // Display Grade C if the score falls within this range
        cout << "Grade C" << endl;
    } else if (score >= 45 && score < 60) {
        // Display Grade D if the score falls within this range
        cout << "Grade D" << endl;
    } else if (score >= 0 && score < 45) {
        // Display Grade F if the score falls within this range
        cout << "Grade F" << endl;
    } else {
        // Handle invalid score inputs (out of range)
        cout << "Invalid score input" << endl;
    }

    return 0;
}
```

Output

```
Enter your score: 78
Grade B

--------------------------------
Process exited after 5.969 seconds with return value 0
Press any key to continue . . .
```

Q 2 Write a program that takes an integer as input and determines if it is both even and divisible by 5.

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare a variable to store the user's number
    int num;

    // Request the user to enter a number
    cout << "Please enter the number: ";
    cin >> num;

    // Check if the number is both even and divisible by 5
    if (num % 2 == 0 && num % 5 == 0) {
        // Display a message if the number meets both conditions
        cout << "The number is even and divisible by 5" << endl;
    } else {
        // Display a message if the number doesn't meet both conditions
        cout << "The number is neither even nor divisible by 5" << endl;
    }

    return 0;
}
```

Output

```
Please enter the number: 67
The number is neither even nor divisible by 5

--------------------------------
Process exited after 2.993 seconds with return value 0
Press any key to continue . . .
```

Q 3 Create a C++ program that checks if a user-provided year is a leap year

ANS

```cpp
#include <iostream>
using namespace std;

int main() {
    // Declare a variable to store the user's input year
    int year;

    // Request the user to enter a year
    cout << "Please enter the year: ";
    cin >> year;

    // Check if the year is divisible by 4 (a basic leap year check)
    if (year % 4 == 0) {
        // Display a message if the year is a leap year (divisible by 4)
        cout << "The year is a leap year" << endl;
    } else {
        // Display a message if the year is not a leap year (not divisible by 4)
        cout << "The year is not a leap year" << endl;
    }

    return 0;
}
```

Output

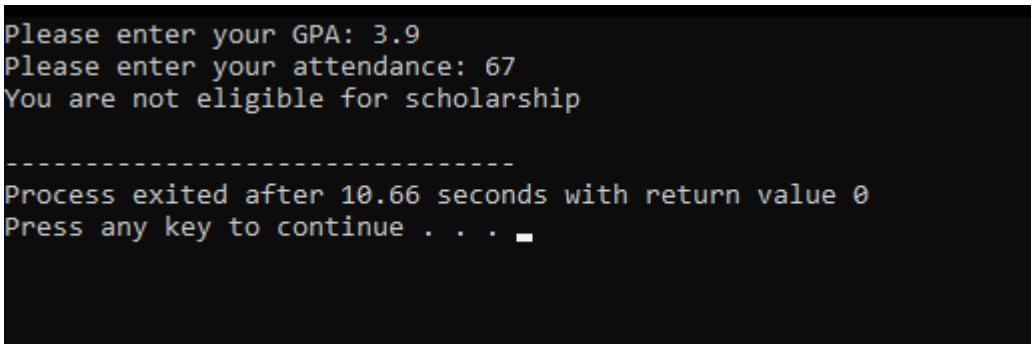
```
Please enter the year: 2022
The year is not a leap year

--------------------------------
Process exited after 5.322 seconds with return value 0
Press any key to continue . . .
```

Q 4 Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA >= 3.5) and attendance (must have attended at least 80% of classes)

ANS

```cpp
#include<iostream>
using namespace std;

int main() {
    // Declare variables to store the GPA and attendance of a student
    double gpa, attendance;

    // Request the user to enter their GPA
    cout << "Please enter your GPA: ";
    cin >> gpa;

    // Request the user to enter their attendance percentage
    cout << "Please enter your attendance: ";
    cin >> attendance;

    // Check if the GPA is greater than or equal to 3.5 and attendance is greater than or equal to 80%
    if (gpa >= 3.5 && attendance >= 80) {
        // Display a message if the student is eligible for a scholarship
        cout << "You are eligible for a scholarship" << endl;
    } else {
        // Display a message if the student is not eligible for a scholarship
        cout << "You are not eligible for scholarship" << endl;
    }

    return 0;
}
```

Output



Q 5 Write a program that checks if a given character is a vowel (a, e, i, o, u) or a consonant using logical operators

ANS

```cpp
#include<iostream>
using namespace std;

int main() {
    // Declare a variable to store the user's input alphabet
    char alphabet;

    // Request the user to enter an alphabet
    cout << "Please enter the alphabet: ";
    cin >> alphabet;

    // Check if the entered alphabet is a vowel (a, e, i, o, or u)
    if (alphabet == 'a' || alphabet == 'e' || alphabet == 'i' || alphabet == 'o' || alphabet == 'u') {
        // Display a message if the alphabet is a vowel
        cout << "Your alphabet is a vowel" << endl;
    } else {
        // Display a message if the alphabet is a consonant
        cout << "Your alphabet is a consonant" << endl;
    }

    return 0;
}
```

Output

```
Please enter the alphabet: e
Your alphabet is a vowel

--------------------------------
Process exited after 4.892 seconds with return value 0
Press any key to continue . . .
```

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