Lab # 2

Objective: For students to get some practice of:

- Using basic C++ types ,Multi-dimentional arrays

- Working with C++ Structures
  - How to pass structure to a function
  - How to create nested structures.
- How to Use Pointers , declaration and manipulation in C++

Q #1: Write a program to compute the length of the line segment connecting two points. For input the two numbers representing each point are entered in the form *(x,y)*. The parentheses and comma are read as character data and then discarded.

The distance between any two points is given by taking out the square root of the formula d= $(x_2-x_1)^2 + (y_2-y_1)^2$. In C++ the square root is evaluated by the function (operation) `sqrt()` that is declared in the file `math.h`.

Q #2. Take two matrix M1 and M2 as an input and perform the addition and multiplication of these two matrices.

$$M1=\begin{pmatrix} 1 & 2 & 3 \\ 3 & 0 & 1 \\ 2 & 1 & 4 \end{pmatrix} \text{ and } M2=\begin{pmatrix} 5 & -10 & 6 \\ 8 & 7 & -1 \\ 0 & 3 & 2 \end{pmatrix} \text{ Note that: } M1+M2=\begin{pmatrix} 6 & -8 & 9 \\ 11 & 7 & 0 \\ 2 & 4 & 6 \end{pmatrix} \text{ and } M1\times M2=\begin{pmatrix} 21 & 13 & 10 \\ 15 & -27 & 20 \\ 18 & -1 & 19 \end{pmatrix}$$

Q.3   Write a program that define structure to maintain student records, structure student should be consisting of the following attributes.

1. Student first name (max 20 characters)

2. Student last name (max 20 characters)

3. Student scores (float/double) e.g 85.4.

Q.4. Pass the structure define in Q.3 to some function to move to display.

Q.5 Create nested structure . Firstly define Address structure and then call address

Structure in Employee Structure and program will give some raise in salary ,if it is less than 50000

Address (house no, city, pin code)

Employee (empid,name,salary,address)

Output:

```
        Enter Employee Id : 101
        Enter Employee Name : Afrazkhan
        Enter Employee Salary : 45000
        Enter Employee House No : 4598/D
        Enter Employee City : Karachi
        Enter Employee Pin Code : 15456

     Details of Employees

        Employee Id : 101
        Employee Name : Afraz Khan
        Employee Salary : 45000
        Employee House No : 4598/D
        Employee City : Karachi
        Employee Pin Code : 15456
```

Q.6.   Write a C++ Program to create a small Calculator by using Pointers