Programming Fundamentals Lab

Lab 11 **Marks 100**

Instructions

Work on this lab individually. You can use your books, notes, handouts etc. but you are not allowed to borrow anything from your peer student.

Submission

Put all the files of your solution in a zipped folder labeled with your roll number.
Upload the zipper file solution(s) folder at Google classroom (https://classroom.google.com) by Thursday, May 07, 2020 before 05:00 PM. No submission will be accepted after this deadline.

Please use your email account at PUCIT domain and the following code to join the class:

Code: 2oosi22

What you have to do

Program the following tasks in your C++ compiler and then compile and execute them. The name of your files will be according to the task given in this lab.

Task 1 [20]

Write a program that lets the user to **enter data in a 3 X 3 matrix** of **integers**. The program should **calculate and display the average** of all the values of the **matrix**.

Task 2 [20]

Ahmed is a student of Mathematics and finds it difficult the **subtraction of two matrices**. You have to help him by giving a program that receives the elements of **two 3 x 3** matrices from him and **store** the **result of the subtraction of both the matrices** into third matrix and **display** its contents. The program calls the following **functions**, which you have to implement:

getData – accept a **matrix** with its **size** and **fill** it with the data entered by the user.

display – accept a **matrix** with its **size** and **display** its contents on the screen.

subtract – accept three **matrices** with their **sizes**, **subtract second matrix from first** and **store** the **result** in the **third**.

getElement – accept a **matrix** with its **size** and **two more parameters** named **row** and **column** and **return the element** exist at the desired **row and column** in the matrix.

Task 3 [20]

Write a program that lets the user to **enter data in a 3 X 4 matrix** of **integers**, and then **calculate** and **return the sum** of all the values exist in the **desired column**. The program calls the following **functions**, which you have to implement:

getData – accept a **matrix** with its **size** and **fill** it with the data entered by the user.

display – accept a **matrix** with its **size** and **display** its contents on the screen.

getColumnTotal – accept a **matrix** with its **size** and a third parameter which indicates the **column index**. The function should **return** the **sum** of all the values in the **specified column**.

Task 4 [20]

Write a program that lets the user to **enter data in a 4 X 3 matrix** of **integers**, and then **determine** and **return the largest element** exist in the **desired row**. The program calls the following **functions**, which you have to implement:

getData – accept a **matrix** with its **size** and **fill** it with the data entered by the user.

display – accept a **matrix** with its **size** and **display** its contents on the screen.

getLargetsInRow – accept a **matrix** with its **size** and a third parameter which indicates the **row index**. The function should **return** the **largest** of all the values in the **specified row**.

Task 5 [20]

Write a program that lets the user to **enter data in a 4 X 4 matrix** of **integers**, and then determine and **display** either it is a **symmetric** matrix of not; a **symmetric** matrix is one whose **transpose** is equal to the original matrix **i.e. $A^T = A$**. The program calls the following **functions**, which you have to implement:

getData – accept a **matrix** with its **size** and **fill** it with the data entered by the user.

display – accept a **matrix** with its **size** and **display** its contents on the screen.

isSymmetric – accept a **matrix** with its **size**, and return **true** if the matrix is **symmetric**, **false** otherwise.

The program should **display** the contents of **original matrix** and its **transpose**.

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