CSE 174 - Lab 12
(20 points): 2D Arrays

In this part you will write six static methods.
1. Create a class called **Lab12** and read the following table about the methods you need to add into your class:

1	A method called **getNumRows** which accepts a 2D-array of ints, and returns the number of rows in the given array. Inside the main method create a 2D array and call this method to see if this method returns the correct value. For instance imagine an array named arr with the following elements: {{0, -1}, {1, 2}, {10, 2}} the result of calling getNumRows(arr) should be 3.
2	A method called **getRowLength** which accepts a 2D-array of ints, and an int value as a row index. This method returns the length of the given row inside the given array. If the given row index is out of bound, this method should return zero. Inside the main method create a 2D array and call this method to see if this method returns the correct value. For instance imagine an array named arr with the following elements: {{0, -1}, {1, 2}, {10, 2, 5}, {3}} The result of getRowLength(arr, 3) should be 1. The result of getRowLength(arr, -1) should be 0. The result of getRowLength(arr, 5) should be 0.
3	A void method called **changeElem** which accepts a 2D-array of ints, one int value as a row index, one int value as a col index, and a new int value to be saved in the array. For instance imagine an array named arr with the following elements: {{0, -1}, {1, 2}, {10, 2, 5}, {3}}

	calling the method changeElem(arr, 2, 0, 300) will change the element at the index of [2][0] which is 10 to 300. Now the elements of the array are:{{0, -1}, {1, 2}, {300, 2, 5}, {3}} If the given row and col are out of bound this method should do nothing, and the given arr stays the same. Inside the main method create a 2D array and call this method to see if this method works as expected.
4	A void method called **display** which accepts a 2D-array of ints, which prints all elements of the array separated by a space. **You must use the enhanced/foreach loop to print the values.** For instance imagine an array named arr with the following elements: {{0, -1}, {1, 2}, {10, 2, 5}, {3}} Calling the method display(arr) your output should look like the following: 0 -1 1 2 10 2 5 3 Inside the main method create a 2D array and call this method to see if this method works as expected.
5	A boolean method called **isMagicRows** which accepts a 2-D array of ints. This array could be any length, but you can assume all rows are the same length. This method returns true if the sums of all rows in the array are equal. It will return false otherwise For example, imagine an array called arr with the following elements: {{1, 2, 3, 4}, {2, 3, 1, 4}, {3, 1, 5, 1}, {4, 4, 1, 1}} Calling the method isMagicRows(arr) should result in a sum of 10 for each row, returning true.

6	A boolean method called **isMagicColumns** which accepts a 2-D array of ints. This array could be any length. This method returns true if the sums of all columns in the array are equal. It will return false otherwise For example, imagine an array called arr with the following elements: {{1, 2, 3, 4}, {2, 3, 1, 4}, {3, 1, 5, 1}, {4, 4, 1, 1}} Calling the method isMagicColumns(arr) should result in a sum of 10 for each column, returning true

- Test all the methods inside the main method to make sure they are all working as expected.
- Make sure the name of the class and methods are exactly the same as mentioned in the instructions.
- Now, submit your work on canvas via the Code Plugin.

Rubric on Next Page

Rubric

Criteria	Full Credit	Partial Credit	No Credit
Successful submission via Code	A fully successful submission to CODE that passes all of the required tests will earn full credit. **12 Points**	Each test is worth **3 Points**	if your submission is not accepted by code, you will receive no credit. **0 Points**
Writing comments for methods	Writing comments for all methods that explain the purpose of the method along with explaining parameters and the return type earn full credit. **2.5 Points**	Complete comments for each method earn **0.4 Point**	Not writing comments or incomplete comments receive no credit. **0 Points**
Using enhanced loop in the display method	Using a enhanced loop **3 Point**		Using other form of loops **0 Points**
Correct Style	If your submission has 0 style errors you will receive full credit. You have comments at the top with your name. **2.5 Point**		If there are any style errors present, you will receive no credit. **0 Points**