CS 1101 – Introduction to Computer Science Spring 2022 Lab 10 - 2D Arrays

Due Date: Friday, April 15, end of the day (11:59pm).

Objective: The goal of this assignment is to get familiar with **2D arrays**.

Assignment:

In this program, you are to create 3 boards following the next steps:

- 1) Ask the user for an integer *n*, this will be the size of the rows and columns of the three boards.
- 2) Declare three 2D array of integers of size *n* example: int [] [] boardOne = [n] [n]

	1=SIZE OT	rows and	l columns n
n			

3) Board One:

• Fill the board with integers following the instructions. For *row 0, column n* and *column 0, row n* ask the user for integers.

The acceptable integers are 1, 2, 3, 4, and 5.

example: the user enters 1,2, 3, 4

1	2	3	4
2			
3			
4			

• Starting in *row 1, column 1* to *row n, column n* fill the board by multiplying the 2 integers value in the previous row.

example: boardOne[1][1] = boardOne[0][0] * boardOne[0][1]

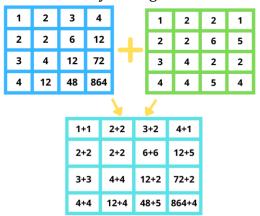
1	2,	3 ,	4
2	1X2	AA	AA
3	4	12	72
4	12	48	864
1	2	3	4
2	2	6	12
3	4	12	72
4	12	48	864

Board Two:

• Fill the board with random numbers from 0-10. (*Including 0 and not including number 10.*)

Board Three:

Fill the board by adding Board One + Board Two



- 4) Print the elements in Board One
- 5) Print the elements in the Diagonal of Board One.
- 6) Prints the sum of the elements of Board One.
- 7) Print the elements in Board Two.
- 8) Print the result of adding all integers in row 0 of Board Two.
- 9) Print the result of adding all integers in column 0 of Board Two.
- 10) Print the average of all the elements in Board Two.
- 11)Print the elements in Board Three.
- 12) Print Board Three in reverse order (from the last element to the first).
- 13)Create an array with the minimum values on each board. Then, print the minimum value found on all boards.

14) Create an array with the maximum values on each board. Then, print the maximum value found on all boards.

Example:

```
Enter the size of the board rxc:
Enter 4 numbers between (1-5)
2
3
4
----Board #1---
    2
         3 | 4 |
     2
         6 | 12 |
2 |
    4
         12 | 72 |
    12 | 48 | 864 |
The elements in the diagonal are:
1,2,12,864,
The sum of all elements: 1051
----Board #2---
     9
         9 |
              2
          2
5
     9
              3
          5
              2
         5
    6
              9
The sum of all elements in row 0: 23
The sum of all elements in column 0: 20
The average of all elements: 5.5
```

```
----Board #3---
4 | 11 | 12 | 6 |
7 | 11 | 8 | 15 |
12 | 11 | 17 | 74 |
7 | 18 | 53 | 873 |
----Board #3 in Reverse---
873 | 53 | 18 | 7 |
74 | 17 | 11 | 12 |
    8 | 11 |
6 | 12 | 11 |
----Min Values array---
[1,2,4,]
----Max Values array---
[ 864 , 9 , 873 , ]
The min value of all elements in all boards: 1
The max value of all elements in all boards: 873
```

Deliverables: You are expected to submit one file to Blackboard:

(i) Lab10 Lastname.java --- the java file of your program.

Grading Criteria:

- [97 points] Java program that is similar to the algorithm.
 - o [20 pts] Program compiles and runs.
 - o [20 pts] The program uses methods, conditional statements, loops, and arrays.
 - o [10 pts] Correct types for each variable, correct naming conventions, and variables should have meaningful variable names.
 - o [35 pts] The program has correct logic and generates correct output. (Implementing arrays)
 - o [5 pts] The program is indented properly.
 - o [5 pts] The program uses meaningful variable names.
 - o [2 pts] The program has proper documentation.
- [3 points] The deliverables follow the proper name Lab10 LastName
- Late submission: [-10] points for every 24 hours after the deadline.

If you need any clarification, please ask your TA for further details.