

Lab 17

Instructions: Complete the steps below. Be sure to show your code to one of the lab TAs before you leave, so that you can receive credit for this lab. You must also upload a copy of all your source code (.java) files to the link on Blackboard by **11:59 PM on Monday November 2, 2020 for L01, L02, L03, L05 and by 11:59 PM on Thursday October 29, 2020 for L06, L07, L08 and L09..**

1. Write the following method that returns the location of the largest element in a two-dimensional array:

```
public static int[] locateLargest(double[][] a)
```

The return value is a one-dimensional array that contains two elements. These two elements indicate the row and column indices of the largest element in the two-dimensional array. Write a test program that prompts the user to enter a two dimensional array and display the location of the largest element in the array. Here is a sample run:

Enter the number of rows and columns in the array: 3 4

Enter the array:

23.5 35 2 10

4.5 3 45 3.5

35 44 5.5 9.6

The location of the largest element is at (1, 2)

2. An $n \times n$ matrix (i.e., a matrix with n rows and n columns) is called a *positive Markov matrix* if each element is positive and the sum of the elements in each column is 1. Write the following method to check whether a matrix is *Markov matrix*:

```
public static boolean isMarkovMatrix(double[][] m)
```

Write a test program that prompts the user to enter 3×3 matrix of double values and tests whether it is a *Markov matrix*. Here are sample runs:

Enter a 3-by-3 matrix row by row:

0.15 0.875 0.375

0.55 0.005 0.225

0.30 0.12 0.4

It is a Markov matrix

Enter a 3-by-3 matrix row by row:

0.95 -0.875 0.375

0.65 0.005 0.225

0.30 0.22 -0.4

It is not a Markov matrix

Grading Guidelines: This lab is graded on a scale of 0-6 points, assigned as follows:

- **0 points:** Student is absent or does not appear to have completed any work for the lab
- **2 point (2*1):** Student has written the program, but it has errors.
- **4 points (2*2):** Student has written the program it compiles without error, but it does not produce the correct output.

- **6 points (2*3):** Student has written the program and it compiles and runs correctly, without any errors.