Lab 21

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 16, 2020 for L01, L02, L03, L05 and by 11:59 PM on Thursday November 12, 2020 for L06, L07, L08 and L09**.

1. Write a program that randomly fills in $0s$ and $1s$ into a 4-by-4 matrix, prints the matrix, and finds the first row and column with most $1s$.

   Here is a sample run of the program:

   0011
   0011
   1101
   1010
   The largest row index: 2
   The largest column index: 2

2. Design a class named LinearEquation for a 2×2 system of linear equations:

   $$ax + by = e$$
   $$cx + dy = f$$

   Where: $x = \frac{ed-bf}{ad-bc}$ and $y = \frac{af-ec}{ad-bc}$

   The class contains:

   - Private data fields $a, b, c, d, e,$ and f.
   - A constructor with the arguments for $a, b, c, d, e,$ and f.
   - Six getter methods for $a, b, c, d, e,$ and f.
   - A method $isSolvable()$ that returns true if $ad - bc$ is not 0.
   - Method $getX()$ and $getY()$ that returns the solution for the equation.

   Write a test program that prompts the user to enter a, b, c, d, e, and f and display the result. If $ad - bc$ is 0, report that "The equation has no solution."

   Here is a sample run:

   Enter a, b, c, d, e, f: 9.0 4.0 3.0 -5.0 -6.0 -21.0
   X is -2.0 and y is 3.0
   Enter a, b, c, d, e, f: 1.0 2.0 2.0 4.0 4.0 5.0
   The equation has no solutions.

   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.