Lab 13

Instructions: Complete the steps below. Be sure to upload a copy of all your source code (.java) files to the link on Brightspace by its deadline, so that you can receive credit for this lab.

1. TicTacToe.java: (Playing a Tic-tac-toe game) In a game of Tic-tac-toe, two players take turns marking an available cell in a 3 x 3 grid with their respective tokens (either X or O). When one player has placed three tokens in a horizontal, vertical, or diagonal row on the grid, the game is over and that player has won. A draw (no winner) occurs when all the cells on the grid have been filled with tokens and neither player has achieved a win. Create a program for playing Tic-tac-toe, as follows: The program prompts the first player to enter an X token, and then prompts the second player to enter an O token. Whenever a token is entered, the program refreshes the board (i.e., re-prints the matrix) and determines the status of the game (win, draw, or unfinished). To place a token, prompt the user to enter the row and the column for the token.

   Example:
   Player one: 1 1
   unfinished
   X - -
   - - -
   - - -

   Player two: 2 2
   unfinished
   X - -
   - O -
   - - -

   Player one: ...

2. (Geometry.java: area of a triangle) Write a method that returns the area of a triangle using the following header:

   ```
   public static double getTriangleArea(double[][] points)
   ```

   The points are stored in a 3-by-2 two-dimensional array points with points[0][0] and points[0][1] for (x1, y1). The triangle area can be computed using the Heron's formula http://en.wikipedia.org/wiki/Heron%27s_formula, while using the Pythagorean Theorem you can find the distance between two points in the coordinate system. The method returns 0 if the three points are on the same line.

   Write a program that prompts the user to enter three points of a triangle and displays the triangle's area.

Here are sample runs of the program:
Enter x1, y1, x2, y2, x3, y3: 2.5 2 5 -1.0 4.0 2.0
The area of the triangle is 2.25
Enter x1, y1, x2, y2, x3, y3: 2 2 4.5 4.5 6 6
The three points are on the same line.

Grading Guidelines: This lab is graded on a scale of **0-3 points**, assigned as follows:

- **0 -** The student did not attend the lab,
- **3 -** The solutions are complete OR the student spent the entire lab solving the required lab problems (in this case, the students may not arrive at the lab after the lab started and may not leave until the lab ends).