CS225 Homework 1
Closest Points Problem

DELIVERABLES: One Java file. File naming convention (required!): *yourusername*HW1.java

Only electronic documents submitted via Canvas are acceptable. Do not submit a hard copy of your assignment. Do not email your assignment to the course instructor or grader. Important: Late assignments will not be graded.

SOURCE CODE: Provide your source code with the features described below.

- Code Quality, Naming Conventions: Your Java file shall be named based on your ERAU email username -- *yourusername*HW1.java.
- Code Quality, In-Code Documentation: Code shall begin with the header shown in Figure 1. Variations are allowed as long as the required information is present. In addition, variable declarations and method (function) definitions must also be commented.
- Code Quality, Formatting: Code should follow standard formatting styles as discussed in class. For example, indentation of code blocks, use and position of brackets.
- Code Quality, Descriptive Component Names: Variable and function names shall be named in a manner to suggest their role in a program and improve clarity of code in general. Example: innerRadius and outerRadius are preferable to r1 and r2. Exceptions may be made for incidental variables. For example, due to the history of programming languages, it is considered standard to use the variables i, j, and k for loop counters.
- Compilation: Points are based on success/failure of compilation.
- Correctness: Points are awarded based on correct program behavior.

```
/*******************************************************************************
* File_name.java
* ASsignment Number: Title
* Author: Firstname Lastname
* Collaborations: List any persons collaborating with you.
* Date: mmddyyyy
*|
* Variable List: List each variable with name, type, and role in the program.
*
* Methods List: List each method with inputs, outputs, and role in the program.
*******************************************************************************/
```

Figure 1: Block Comment Format

PROBLEM DESCRIPTION: It is common when working with a set of points to determine properties such as the closest pair, most distant pair, density, bounding envelope and so on. For this homework you will complete the closest pairs problem.

Given two points, (x_1, y_1) and (x_2, y_2), the distance, d, between them is given by the Pythagorean Theorem:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

For this homework, given a set of points, find the smallest distance, d.

REQUIREMENTS: Your solution must contain the following:

1. Two attributes of type double[] (i.e. arrays of type double), one for the x-locations and one for the y-locations of the points. Use ten points so the size of each array is ten. You may have more attributes than this, but you must have these two.
2. A method that populates the arrays for the x- and y-locations of the ten points. Use random values between 0 and 100.
3. A method that prints out all ten points as (x, y) value pairs.
4. A method that finds the smallest distance between two points.
5. A method that prints out the results to include: smallest distance, x- and y-locations of the two points.
6. Output to console: Your name, the ten points listed as (x, y) value pairs, the smallest distance, the (x, y) values of the two points that are closest.

RUBRIC: Per that grading rubric below (See Homework 0 for definitions and instructions.)

Deliverable	Points	Awarded
Code quality (remember initial comments!)	10	
Code compilation	5	
Code outputs required items	10	
Correctness	15	
Totals	40	