CS 170 -- Section 001

Homework 4 (Due 11/09/2012 at 23:59)

Honor Code: Like all work for this class, the Emory Honor Code applies. You should do your own work on all problems, unless you are explicitly instructed otherwise. If you get stuck or have questions, ask your instructor or a TA for help.

Please make sure that you have added the honor code statement at the top of every program file:

/* THIS CODE IS MY OWN WORK. IT WAS WRITTEN WITHOUT CONSULTING CODE WRITTEN BY OTHER STUDENTS OR MATERIALS OTHER THAN THIS SEMESTER'S COURSE MATERIALS. _Your_Name_Here_ */

Replace _Your_Name_Here_ with your name.

Get into your working directory and copy two files to your current directory by running the following command:

```
cp /home/cs170001/share/hw/hw4.java ./
cp /home/cs170001/share/hw/hw4Helper.java ./
```

You are supposed to implement functions defined in hw4Helper.java. Notice: Do NOT change anything in hw4.java. It's encouraged to start with reading the existing content in these two files instead of jumping into coding directly.

Description: The assignment is to calculate and store distances from bunch of points on a 2-dimensional plane to the origin point. The position of each point on the plane is represented by its horizontal and vertical coordinates, and origin has the coordinates (0, 0) by default.

hw4.java: It reads an integer through commend line parameters, which indicated the total number of points. In the main function, it generates points with a *for* loop, and it pushes each newly generated point to *hw4Helper* by calling *addNewPoint* function in *hw4Helper*. After all the points are pushed into *hw4Helper*, it asks *hw4Helper* how many points have been generated, as well as the longest distance and shortest distance ever seen. In the end, it asks *hw4Helper* to print out all the distances. (See the file content for more details.)

hw4Helper.java:

Four static class variables:

pointCount: counts the number of points received from hw4.
distanceArray: stores all the distances.
shortestDistance: stores the current shortest distance.
longestDistance: stores the current longest distance.

Three static class functions:

double getDistance(double[] *a*): calculates and returns the distance from point a to origin.

void addNewPoint(double[] *a*): the major function to receive points pushed by hw4. Given point *a* as the parameter, it will calculate the distance from *a* to the origin (0, 0) first, then store the distance in class variable *distanceArray*, and update *pointCount*, *shortestDistance*, and *longestDistance* accordingly.

void printAllDistance(): print all the distances stored in *distanceArray*.

References:

Distance formula: $\sqrt{a[0]^2 + a[1]^2}$.
Function of square root: Math.sqrt(a) returns the square root of a.

Run your program (make sure hw4.java and hw4Helper.java are in the same folder) and the sample output:

```
$ javac hw4.java
$ java hw4 10
Number of points: 10
Shortest distance from origin: 2.658310021416013
Longest distance from origin: 10.720617699849962
All distance:
1: 7.341445215435294
2: 10.488352210820064
3: 5.35788826969824
4: 5.882214270441005
5: 10.720617699849962
6: 6.090764958789204
7: 9.617954883189197
8: 9.345514121895858
9: 2.658310021416013
10: 3.628653280108693
```

Turning in:

/home/cs170001/turnin-hw hw4Helper.java hw4