# 10.11.2021

COMP 1111 - Fundamentals of Programming Programming Project 1 Due: Monday, November 24rd 11:59 PM



This is a strictly individual assignment. That means, you are not allowed to take a peek at any solutions, including online resources, and you are not allowed to share your answers with anyone, including your classmates. You are not allowed to program together with your friends or relatives. You are only allowed to use your lecture notes and the textbook. Failure to follow these rules will result in getting only 1 point for the project.

Write a java class named Dart (with no package name) to solve the following problem and upload it to Blackboard as described in the submission instructions.



You are given a square dart board as shown below. Assume that we are throwing darts to hit this board. Every dart hits the board, at a random coordinate (x,y).



Write a Java program that simulates this dart game. Read the number of darts to be thrown from the user (from the keyboard). Randomly generate the target coordinates of the darts on the board. This is done by generating each time two random numbers that are valid coordinates inside the board. Check the borders of the dart area. Also, each coordinate has one digit after the decimal point. Display the coordinates and the region of the target within the board.

Lastly, display the statistics of the number and percentage of dart hits for each region. If the dart falls on the boundary between two regions, consider its region as undecided.

Dart’s target coordinate and region matching rules are as follows (explained with examples):

If the randomly generated target coordinate is x = 0.2 and y = -0.5, the dart hits the region F (where x coordinate is positive and y coordinate is negative).

If the randomly generated target coordinate is x = -0.5 and y = 0.7, the dart hits the region C (where x coordinate is negative and y coordinate is positive).

If the randomly generated target coordinate is x = 0.4 and y = 0.3, the dart hits the region A (where x and y coordinates are both positive and x+y is smaller than 1).

If the randomly generated target coordinate is x = 0.4 and y = 0.7, the dart hits the region B (where x and y coordinates are both positive and x+y is larger than 1).

The line equation x+y = 1 is the line between region A and region B.

If the randomly generated target coordinate is x = -0.5 and y = -0.4, the dart hits the region D (where x and y coordinates are both negative and x is smaller than y).

If the randomly generated target coordinate is x = -0.4 and y = -0.5, the dart hits the region E (where x and y coordinates are both negative and x is bigger than y).

The line equation x=y is the line between region D and region E.



1



x



1



-

1



-

1



C



A



B



D



E



F

Sample run 1:

DART GAME!

Enter the number of darts to be thrown: 5

Dart 1:

Coordinates: (0.2, 0.1) Region: A

Dart 2:

Coordinates: (0.7, -0.2)

Region: F

Dart 3:

Coordinates: (0.1, -0.8)

Region: F

Dart 4:

Coordinates: (-0.1, -0.1)

Region: Undecided

Dart 5:

Coordinates: (-0.9, 0.6)

Region: C

Region statistics:

A: 1 dart (20.0%)

B: 0 darts (0.0%)

C: 1 dart (20.0%) D: 0 darts (0.0%)

E: 0 darts (0.0%)

F: 2 darts (40.0%)

Undecided: 1 dart (20.0%)

----------------------------------------------------------------------------------------------------------

Sample run 2:

DART GAME!

Enter the number of darts to be thrown: 1000

Dart 1:

Coordinates: (0.6, -0.6) Region: F

Dart 2:

Coordinates: (-0.9, -0.1) Region: D

Dart 3:

Coordinates: (-0.5, 0.3) Region: C

…

Dart 1000:

Coordinates: (0.8, 0.9)

Region: B

Region statistics:

A: 115 darts (11.5%)

B: 120 darts (12.0%)

C: 248 darts (24.8%)

D: 131 darts (13.1%)

E: 122 darts (12.2%)

F: 262 darts (26.2%)

Undecided: 2 darts (0.2%)

----------------------------------------------------------------------------------------------------------

**Suggested Milestones**

Step 1: First create only one coordinate (x,y)

* Create a random x and a random y
* Modify x and y so that they have one digit after the decimal point (e.g. (0.2,-0.5))

Step 2: Find at which region do you hit the dart board with this coordinate by checking the coordinate-region matching rules

Step 3:

* Identify the statements you need to repeat to throw N darts. N is the number of darts to be thrown is given by the user
* Surround those statements with a loop
* Find loop continuation condition

Step 4: Count number of dart hits for each region

**Submission Instructions**

* Make sure that the program does not contain a “package” declaration. Otherwise, remove it and test your program again.
* Create a zip file named 1\_Proj1\_<StudentID>.zip where <StudentID> stands for your student ID, e.g. 1\_Proj1\_20COMP2786.zip that contains the file Dart.java.
* Test your file [here](http://193.255.146.105/homework/) (detailed instructions to come soon).
* Upload the zip file to Blackboard.