Programming Technology: Assignment 1 number 6

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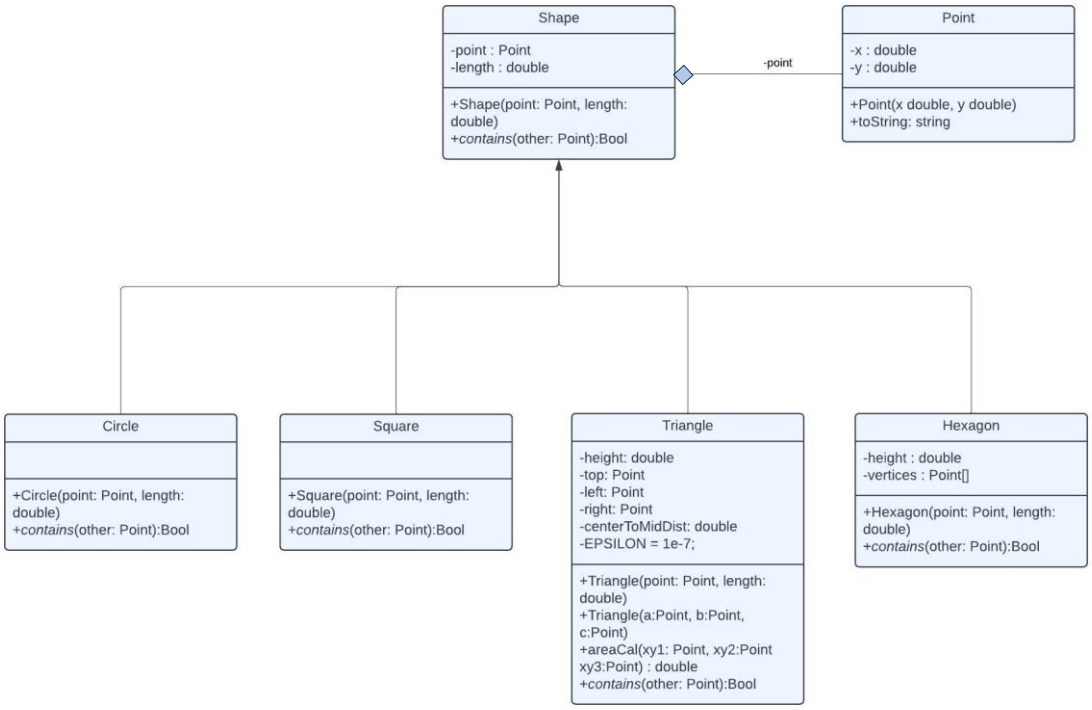
the description of the exercise

6. Choose a point on the plane and fill a collection with several regular shapes (circle, regular triangle, square, regular hexagon). How many shapes contain the given point? Each shape can be represented by its center and side length (or radius), if we assume that one side of the polygons are parallel with x axis, and its nodes lies on or above this side. Load and create the shapes from a text file. The first line of the file contains the number of the shapes, and each following line contain a shape. The first character will identify the type of the shape, which is followed by the center coordinate and the side length or radius. Manage the shapes uniformly, so derive them from the same super class.

Discussion

there are 5 types of shapes. Which is {circle, regular triangle square, regular hexagon}
all class have a center point (its might be the tuple of X and Y) and the length (or radius).
So, I have to think each check function (which check this shape contains the point).
But I know some function in C#, which might be helpful to this task. I will check C# docs;

the class diagram



the short description of each method

shape have a contains function. I am going to describe shorter each function.

Circle:

the function use the Euclidean distance. The Formula is

Distnce^2 = (x2 – x1)^2 + (y2 – y1)^2

If Distance less than diameter, this circle contains the point.

Triangle:

If the triangle contains the point, we can make three triangles. So we going to calculate the Circle and new three triangles' area. If the three triangles' Area equal the Circle area, its will be the shape contains the Point.

Hexagon:

Before describing Square, I will deal with the Hexagon. Because it's easy.

We can think Hexagon made of 6 triangles. So we calculate each Point, and using Triangle's logic.

Square:

Calculating each point(4 point) and checking if the given point x and y coordinates lie within the boundaries of the rectangle.

the testing (white box/ black box)

test1.txt
to check my code

1
C 1 1 4

Given Point = 1.0 1.0
Expected output:
Given point contains 1 shapes

Test2.txt
To check large numbers

1
s 1000000000.0 1000000000.0 500000000.0

Given Point = 1000000000 1000000000
Expected output:
Given point contains 1 shapes

Text3.txt
To check triangle and hexagon

2
h 0.0 0.0 4.0
t 3.0 3.0 2.0

Given Point = 1000000000 1000000000
Expected output:
Given point contains 1 shapes

Text4.txt
To check invalid input

1
c ten 15.0 5.0

Given Point = 1 1
Expected output:
"Invalid input!"

NoFile.txt(it does not exist)
To check no file(FileNotFoundException).

Given Point = 1 1
Expected output:
“File not found!"