CMPE 261 - Large Scale Programming

Assignment-01

Deadline: 09:00, October 31

In your assignment,explain your codes with *comments*. Without *comments*,your assignment will not be marked.

Problem

In this assignment you are asked to implement a simple project about geometric shapes such as circle, rectangle and square. All shapes must implement following interface. While doing this project student should design classes effectively with OOP concept. So student must consider relations between classes such as, "is a" and "has a" relations and don't repeat methods that handle the same tasks. Because all shapes has common and different properties, students should consider abstract class, interface and overloading methods etc.

```
 public interface IShape {

// area of a shape
public double area();

// distance between (0,0) and the point used to draw a shape
public double distanceToCoordinateCenter();

//rectangle is a full shape if: distanceToCoordinateCenter() > w+h
//circle is a full shape if: distanceToCoordinateCenter() > r
//square is a full shape if: distanceToCoordinateCenter() > w
// w is width, r is radius, h is height
public boolean isFullShape();


// returns "Circle", "Rectangle" or "Square"
public String thisIsa(IShape shape);
```

```
// Retruns data such as: width, radius and size(if it is a squar) etc.
public String propertiesOfShape( );

// Retruns shape ID.
public String shapeId();
}
```

Running

When the program is executed, there is a **menu** appeared with option (menu must be displayed with the **JOpionPane** class). The options are:

- Create Random Shapes: creates random number of shapes include such as rectangle,circle and square. In the second step in this option, users have to input a number for total number shapes. Then algorithm decides specific number of rectangles,squares and circles randomly.
- Circles: creates only circles
- Rectangles: creates rectangles only
- Squares: creates squares only
- Print All Shapes: Displays all shapes to the console. Please us "System.out.format()" method to get formatted output (see below).
- Print Circles: Displays only circles.
- Print Rectangles: Displays only Rectangles.
- Print Squares: Displays only Squares
- Exit: Exit from the program

When shapes a displayed, total number of listed shapes and the total area also have to be displayed. See below as an example (Out put of the "Print All Shapes" option):

```
Id     Type       Area        FullShape Distance  Properties
R7695  Rectangle  1680.000    true       297.061  The Width is:10 The height is:168
S7673  Square     32400.000   false      344.118  The size of this Square is:180
C7518  Circle     104062.115  false      56.648   The radius of this Cirlce is:182
S6940  Square     6241.000    true       414.461  The size of this Square is:79
S6030  Square     3364.000    true       189.003  The size of this Square is:58

The are 5 shapes have been listen and the area of all shapes are: 147747.12
```

In the console:

- ID column: ID of the shapes with 4 digits of integer numbers that prefixed with “R” for rectangle, ”C” for circle and “S” for squares.
- Type column: Types of the shapes that have been listed
- Area column: Area of the shape
- Full_Shape column: true &false
- Distance column: Distance from the coordinate center(0,0) to the current shape
- Properties column: Shape related parameters

Note: when ever new shapes are creating, your program must check if there are some previously generated shapes exist or not. If there are, then ask to keep them or delete, see the demo on the LMS.