CPSC 1181 - Lab 6 [55 marks]

Objectives:

- Design drawing methods for shapes
- Design Components and Frames in Graphical Applications
- Describe the importance of code refactoring

Submission:

- Zip up all of Java files and submit them to D2L prior to the due date.
- Unzipped submissions or submissions containing .class files will be automatically given ZERO

Exercise 1

Modify GeometricShape.java to have two more instance data representing the (x,y) location the shape is drawn at. Create a constructor that sets all four properties of the GeometricShape. Create getters and setters for the new values. Modify the type of the color instance data to be **`Color`** from the java.awt package.

Exercise 2

Modify the constructors of Circle and Octagon to accept values for X and Y, and change the type of the color parameter to be **`Color`**.

Exercise 3

Create the method **`public void draw(Graphic2D g2)`** in circle and octagon. This method should draw the shape at the location given by the instance data x and y. The shape should be drawn in the color specified by the color instance data, and if the shape should be filled with the color, the draw method should fill the shape.

Hint

We know one point on our Octagon, the x and y that are passed as parameters, as well as the side length d.

We can use Pythagoras to find out the length a, which will allow us to figure out all the points on our octagon using addition and subtraction.

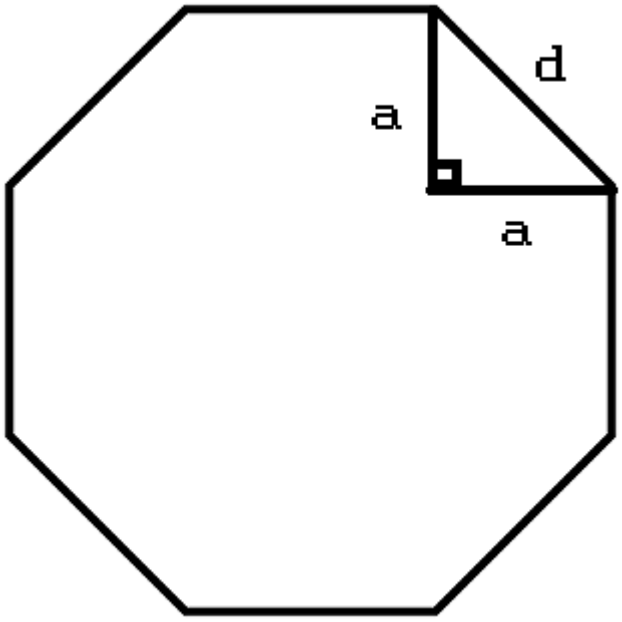
Given a right triangle with two equal sides, we know that

$$a^2 + a^2 = d^2$$

then

$$\sqrt{(2 * a^2)} = d$$

So we must solve for a.



Exercise 4

Create a class called ShowShapes with a main method. In the main method create a Frame that is 500 by 500. Set the usual properties of the frame.

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Exercise 5
Create a ShapeComponent class that extends JComponent. Create the paintComponent method and make it draw a row of Octagons that alternate between being filled and being empty. Then draw a row of colored circles that alternate between being filled and being empty. Add a shapeComponent to the frame created in the previous exercise.

Exercise 6
Create a new subclass of GeometricShape called Pentagon. Implement the usual members for the class, including the inherited abstract methods. Create a draw method that draws a Pentagon at the location given by the x and y instance data. The Pentagon should be drawn in the color specified by the color instance data, and if the Pentagon should be filled with the color, the draw method should fill the Pentagon.

Then add a row of Pentagons to the ShapeComponent. The Pentagons should be randomly colored and alternate between being filled and unfilled.

Marking Rubric:

Style, Convention, Documentation [5 marks]
Modifications to GeometricShape [5 marks]

ShowShapes.java[6 marks]
+5 setting properties of Frame
+1 adding shapeComponent
Circle.java [6 marks]
+3 updating instance data
+3 correctly implementing draw

Octagon.java [10 marks]
+3 updating instance data
+7 correctly implementing draw
Pentagon.java [12 marks]
+7 correct members and inheritance
+5 correctly implementing draw
ShapeComponent.java[10 marks]
+1 extends
+3 row of Octagons
+3 row of Circles
+3 row of Pentagons

Bonus: +3 for making all the shapes truly random colors