

CSC 202
Project 4

Objective: Gain the base concept of classes and testing.

Instructions:

1. Implement the following classes.
2. Understand that “#” means protected, “+” means public, and “-” means private.

Pentagon
-point: java.awt.Point -sideLength: int
+Pentagon(x:int,y:int,sideLength:int) +Pentagon(point:Point,sideLength:in +getPerimeter(): double +getArea(): double +setPoint(point:Point): void +setPoint(x:int,y:int): void +setSideLength(sideLength:int): voi +getPoint(): Point +getSideLength(): int

The formula for area (from Wikipedia) for regular pentagons is the following:

$$A = \frac{5t^2 \tan(54^\circ)}{4}.$$

The formula for perimeter is the following: $P = 5 * \text{the sideLength}.$

The following is what the grader will use for testing:

```
import java.awt.Point;
public class Project4Tester {
    public static void main(String [] args) {
        Pentagon p1 = new Pentagon(1,2,3);
        Pentagon p2 = new Pentagon(new Point(4,5),4);
        Pentagon p3 = new Pentagon(new Point(4,5),6);
        if (p1.getPerimeter() != 15 || p2.getPerimeter() != 20 || p3.getPerimeter() != 30)
            System.err.println("Error 1: Perimeter not correct");
        if ( (p1.getArea() < 15.4 || p1.getArea() > 15.5) ||
            (p2.getArea() < 27.5 || p2.getArea() > 27.6) ||
            (p3.getArea() < 61.9 || p3.getArea() > 62.0) )
            System.err.println("Error 2: Area not correct");
        if ( p1.getSideLength() != 3 || p2.getSideLength() != 4 || p3.getSideLength() != 6 )
            System.err.println("Error 3: getSideLength not correct");
        p1.setSideLength(10);
        p2.setSideLength(11);
        p3.setSideLength(12);
        if ( p1.getSideLength() != 10 || p2.getSideLength() != 11 || p3.getSideLength() != 12 )
            System.err.println("Error 4: setSideLength not correct");
        if ( p1.getPoint().x != 1 || p2.getPoint().x != 4 || p3.getPoint().x != 4 )
            System.err.println("Error 5: getPoint not correct");
        p1.setPoint(3,4);
        p2.setPoint(new Point(5,5));
        if ( p1.getPoint().x != 3 || p2.getPoint().x != 5 || p3.getPoint().x != 4 )
            System.err.println("Error 6: setPoint not correct");
        System.out.println("If you have reached this point with no errors then your Pentagon class has
passed the pass-off.");
    } //end main
} //end class
```

Rubric:

Points	Item
1	Test program compiles with student's code
2	No error 1
2	No error 2
1	No error 3
1	No error 4
1	No error 5
2	No error 6
10	