Lab 6

Demo Points

Stories 9-27 (18 Stories) (72 marks)

For each story (4 Marks):

1. There are no compiler errors in the project (1 mark)

2. All of the JUnit tests for the previous stories work (1 mark)

3. The JUnit test runs for the current story (1 mark)

4. The story completes as shown in the example column of the backlog (1 mark)

Next Week

Next week you will implement an interface for shapes. Implement an interface called AreaComparable that defines areaLT, areaGT, areaEqual and area. The methods areaLT, areaGT, and areaEqual take an object as a parameter and return true if the area of the two objects is equal. The area method takes no parameter and returns a double that is the area of the object.

First, type in the test files shown below. Remember to do it incrementally so you can get all of the error removed.

```java
package oop.shapes;

import static org.junit.Assert.*;

public class AreaComparableTest implements AreaComparable {

    @Test
    public void testAreaLT() {
        assertEquals(false, this.areaLT(this));
    }

    @Test
    public void testAreaGT() {
        assertEquals(false, this.areaGT(this));
    }

    @Test
    public void testAreaEqual() {
        assertEquals(false, this.areaEqual(this));
    }

    @Test
    public void testArea() {
        assertEquals(0, this.area(), .001);
    }

}
```
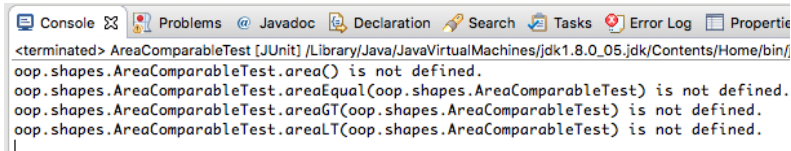
When the test is run, it should produce the following output on the console.

```
Console 23    Problems  @ Javadoc   Declaration   Search   Tasks   Error Log   Propertie
<terminated> AreaComparableTest [JUnit] /Library/Java/JavaVirtualMachines/jdk1.8.0_05.jdk/Contents/Home/bin/
oop.shapes.AreaComparableTest.area() is not defined.
oop.shapes.AreaComparableTest.areaEqual(oop.shapes.AreaComparableTest) is not defined.
oop.shapes.AreaComparableTest.areaGT(oop.shapes.AreaComparableTest) is not defined.
oop.shapes.AreaComparableTest.areaLT(oop.shapes.AreaComparableTest) is not defined.
```

Once you have the interface working properly, add the interface to rectangle, circle and square. Make sure you create tests for all of the elements. For example, the test for square will look like this when you get ready to add the interface and define the area() method. That is, you will add the new test testArea() to the SquareTest JUnit test.

```java
package oop.shapes;

import static org.junit.Assert.*;

public class SquareTest {

    Point tl = new Point(0, 0);
    Point tr = new Point(0, 0);
    Point bl = new Point(0, 0);
    Point br = new Point(0, 0);
    Square s;

    @Test
    public void testArea() {
        tl = new Point(0, 0);
        tr = new Point(0, 1);
        bl = new Point(1, 0);
        br = new Point(1, 1);
        s = new Square(tl, tr, bl, br);
        assertTrue(s.isRightShape());
        assertEquals(1, s.area(), .001);
    }

    @Test
    public void testNotQuadrilateral() {
        //not Quadrilateral
        tl = new Point(0, 0);
```

We will want to compare areas between Shapes, so we will need to refactor our program to add a common type to Circle and all of the Quadrilaterals. To do this all we need to do is make Quadrilateral and Circle extent Shapes.

When you have all of the functions implemented, the additional tests will look like testAreaLT:

```java
@Test
public void testAreaLT() {
    tl = new Point(0, 0);
    tr = new Point(0, 1);
    bl = new Point(1, 0);
    br = new Point(1, 1);
    s = new Square(tl, tr, bl, br);
    assertTrue(s.isRightShape());
    tl = new Point(0, 0);
    tr = new Point(0, 2);
    bl = new Point(2, 0);
    br = new Point(2, 2);
    Square s1 = new Square(tl, tr, bl, br);
    assertTrue(s1.isRightShape());
    assertTrue(s.areaLT(s1));
    assertFalse(s1.areaLT(s));
}
```

You will need to add testAreaGT, and testAreaEqual.

Once the Square tests go green, start with the tests for Rectangle and Circle. Remember, the formula for the area of a square or rectangle is height time width. You can calculate the height and width using Shapes.distance(Point a, Point b). The area of a circle is 2 * pi * radius.

Next Week's Demo Points (20 Marks)

Story 28 (5 marks)

1. AreaComperableTest for area() succeeds and prints "area() is not defined." (1 mark)

2. AreaComperableTest for areaLT() succeeds and prints "area() is not defined." (1 mark)

3. AreaComperableTest for areaGT() succeeds and prints "area() is not defined." (1 mark)

4. AreaComperableTest for areaEquals() succeeds and prints "area() is not defined." (1 mark)

5. All JUnit tests run (1 mark)

Stories 29-31

For each story (5 Marks):

6. The test for area() succeeds (1 mark)

7. The test for areaLT() succeeds and prints "area() is not defined." (1 mark)

8. The test for areaGT() succeeds and prints "area() is not defined." (1 mark)

9. The test for areaEquals() succeeds and prints "area() is not defined." (1 mark)

10. All JUnit tests run (1 mark)