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Course: Java Programming 1
Homework 5
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Source:

Shape.java:

```
public abstract class Shape {
    private static int count = 0;

    public Shape() {
        count++;
    }

    public static int numShapes() {
        return count;
    }

    public abstract double area();
}
```

Circle.java:

```
import java.lang.Math;

public class Circle extends Shape {
    private static int count = 0;

    private double radius;

    public Circle(double radius) {
        super();
        count++;
        this.radius = radius;
    }

    public static int numCircles() {
        return count;
    }

    public double area() {
        return Math.PI * radius * radius;
    }
}
```

Rectangle.java:

```
public class Rectangle extends Shape {
    private static int count = 0;

    private double width;
    private double length;

    public Rectangle(double width, double length) {
        super();
        count++;
        this.width = width;
        this.length = length;
    }

    public static int numRectangles() {
        return count;
    }

    public double area() {
        return width * length;
    }
}
```

Drawable.java:

```
public interface Drawable {
    public void draw();
}
```

GraphicCircle.java:

```
public class GraphicCircle extends Circle implements Drawable {
    private int color = 0;

    public GraphicCircle(double radius, int color) {
        super(radius);
        this.color = color;
    }

    public void draw() {
        System.out.println(" circle drawn using color: " + color);
    }
}
```

GraphicRectangle.java:

```
public class GraphicRectangle extends Rectangle implements Drawable {
    private int color = 0;

    public GraphicRectangle(double width, double length, int color) {
        super(width, length);
        this.color = color;
    }

    public void draw() {
        System.out.println(" rectangle drawn using color: " + color);
    }
}
```

Test Source:

Test.java:

```
class Test{
    public static void main(String args[]) throws Exception{
        Circle x1 = new Circle(3);
        Circle x2 = new Circle(4);
        GraphicCircle c1 = new GraphicCircle(5,1);
        GraphicCircle c2 = new GraphicCircle(7,3);
        Rectangle y1 = new Rectangle (2,3);
        Rectangle y2 = new Rectangle (4,5);
        GraphicRectangle r1 = new GraphicRectangle (3,5,1);
        GraphicRectangle r2 = new GraphicRectangle (5,7,3);
        System.out.println("All Circles="+Circle.numCircles());
        System.out.println("All Rects="+Rectangle.numRectangles());
        System.out.println("All Shapes="+Shape.numShapes());

        Shape shapes[] = new Shape[8];
        shapes[0]=c1;
        shapes[1]=c2;
        shapes[2]=r1;
        shapes[3]=r2;
        shapes[4]=x1;
        shapes[5]=x2;
        shapes[6]=y1;
        shapes[7]=y2;
        double totalArea=0;
        for (int i=0; i<shapes.length; i++){
            totalArea+=shapes[i].area();
        }
        System.out.println("Total area= " +totalArea);
        Drawable drawables[] = new Drawable[4];
        drawables[0]=c1;
```

```
        drawables[1]=c2;
        drawables[2]=r1;
        drawables[3]=r2;
        for (int i=0; i<drawables.length; i++){
            drawables[i].draw();
        }
    }
}
```

Test Output: