Selected files

5 printable files

```
Lab 3\2A\Circle.java
Lab 3\2A\Rectangle.java
Lab 3\2A\Shape.java
Lab 3\2A\Square.java
Lab 3\2A\TestShape.java
```

Lab 3\2A\Circle.java

```java
public class Circle extends Shape {
    // Instance variable
    private double radius;

    // Constructors
    public Circle() {
        super();
        this.radius = 1.0;
    }

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

    public Circle(double radius, String color, boolean filled) {
        super(color, filled);
        this.radius = radius;
    }

    // Getter and setter for radius
    public double getRadius() {
        return radius;
    }

    public void setRadius(double radius) {
        this.radius = radius;
    }

    // Methods
    public double getArea() {
        return Math.PI * radius * radius;
    }

    public double getPerimeter() {
        return 2 * Math.PI * radius;
    }

    // Override toString method
    @Override
    public String toString() {
        return "A Circle with radius=" + radius + ", which is a subclass of " + super.toString();
    }
}
```

Lab 3\2A\Rectangle.java

```java
public class Rectangle extends Shape {
    // Instance variables
    private double width;
    private double length;

    // Constructors
    public Rectangle() {
        super();
        this.width = 1.0;
        this.length = 1.0;
    }

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

    public Rectangle(double width, double length, String color, boolean filled) {
        super(color, filled);
        this.width = width;
        this.length = length;
    }

    // Getter and setter for width and length
    public double getWidth() {
        return width;
    }

    public void setWidth(double width) {
        this.width = width;
    }

    public double getLength() {
        return length;
    }

    public void setLength(double length) {
        this.length = length;
    }

    // Methods
    public double getArea() {
        return width * length;
    }

    public double getPerimeter() {
        return 2 * (width + length);
    }

    // Override toString method
    @Override
    public String toString() {
        return "A Rectangle with width=" + width + " and length=" + length + ", which is a subclass of "
                + super.toString();
    }
}
```

Lab 3\2A\Shape.java

```java
public class Shape {
    // Instance variables
    private String color;
    private boolean filled;

    // Constructors
    public Shape() {
        this.color = "green";
        this.filled = true;
    }

    public Shape(String color, boolean filled) {
        this.color = color;
        this.filled = filled;
    }

    // Getters and setters
    public String getColor() {
        return color;
    }

    public void setColor(String color) {
        this.color = color;
    }

    public boolean isFilled() {
        return filled;
    }

    public void setFilled(boolean filled) {
        this.filled = filled;
    }

    // toString method
    @Override
    public String toString() {
        String filledStatus = filled ? "filled" : "Not filled";
        return "A Shape with color of " + color + " and " + filledStatus;
    }
}
```

Lab 3\2A\Square.java

```java
public class Square extends Rectangle {
    // Constructors
    public Square() {
        super();
    }

    public Square(double side) {
        super(side, side);
    }

    public Square(double side, String color, boolean filled) {
        super(side, side, color, filled);
    }

    // Override toString method
    @Override
    public String toString() {
        return "A Square with side=" + getWidth() + ", which is a subclass of " + super.toString();
    }

    // Override setWidth and setLength to maintain square geometry
    @Override
    public void setWidth(double side) {
        super.setWidth(side);
        super.setLength(side);
    }

    @Override
    public void setLength(double side) {
        super.setWidth(side);
        super.setLength(side);
    }
}
```

Lab 3\2A\TestShape.java

```
public class TestShape {
    public static void main(String[] args) {
        // Test Shape class
        Shape shape1 = new Shape();
        System.out.println(shape1);

        Shape shape2 = new Shape("blue", false);
        System.out.println(shape2);

        // Test Circle class
        Circle circle1 = new Circle();
        System.out.println(circle1);
        System.out.println("Area: " + circle1.getArea());
        System.out.println("Perimeter: " + circle1.getPerimeter());

        Circle circle2 = new Circle(3.5, "red", true);
        System.out.println(circle2);
        System.out.println("Area: " + circle2.getArea());
        System.out.println("Perimeter: " + circle2.getPerimeter());

        // Test Rectangle class
        Rectangle rectangle1 = new Rectangle();
        System.out.println(rectangle1);
        System.out.println("Area: " + rectangle1.getArea());
        System.out.println("Perimeter: " + rectangle1.getPerimeter());

        Rectangle rectangle2 = new Rectangle(2.5, 4.0, "yellow", false);
        System.out.println(rectangle2);
        System.out.println("Area: " + rectangle2.getArea());
        System.out.println("Perimeter: " + rectangle2.getPerimeter());

        // Test Square class
        Square square1 = new Square();
        System.out.println(square1);
        System.out.println("Area: " + square1.getArea());
        System.out.println("Perimeter: " + square1.getPerimeter());

```

```java
        Square square2 = new Square(5.0, "purple", true);
        System.out.println(square2);
        System.out.println("Area: " + square2.getArea());
        System.out.println("Perimeter: " + square2.getPerimeter());
    }
}

```