CS101 Quiz 3

Name:

Write a class, **Rectangle** that denotes a rectangle with side lengths **a** and **b**. Take a and b as floating-point numbers. Define two constructors: a default construct with an empty parameter list and empty method body. The other must take two floating-point numbers and set a and b appropriately. If any of the parameters is non-positive, your constructor should display an appropriate error message and set the respective side length to 1. Add the necessary **setter/getter methods**. Furthermore, add 3 non-static methods:

- **getPerimeter()** that returns the perimeter of the rectangle (2a+2b)
- **getArea()** that returns the area of the rectangle (a x b)
- **display()** that displays the side lengths of the rectangles and perimeter and area for the rectangle

Below is a tester (driver/client) class for this class. Remember that a tester class has the main method. The aim is to test the Rectangle class.

```java
public class RectangleTester {
    public static void main(String[] args) {
       // Test default values for instance variables
       Rectangle first = new Rectangle();
       System.out.println("Test default values for instance variables:");
       first.display();

       // update the values of the default rectangle to 2 and 3
       first.setA(2);
       first.setB(3);
       System.out.println("");
       System.out.println("Update the values of the rectangle to 2 and 3:");
       // display
       first.display();

       System.out.println("");
       System.out.println("Try the constructor with negative values:");
       // try the constructor with negative values, -5 and -3
       Rectangle second = new Rectangle(-5, -3);
       second.display();
    }
}
```

Sample Run

```
Test default values for instance variables:
This rectangle has side lengths 0.00 and 0.00
Area and perimeter are:0.00 and 0.00

Update the values of the default rectangle to 2 and 3:
This rectangle has side lengths 2.00 and 3.00
Area and perimeter are:6.00 and 10.00

Try the constructor with negative values:
Length must be positive, setting a to 1
Length must be positive, setting b to 1
This rectangle has side lengths 1.00 and 1.00
Area and perimeter are:1.00 and 4.00
```

```java
public class Rectangle
{
    private double a, b;
    public Rectangle ()
    {
    }

    public Rectangle (double a, double b)
    {
        setA(a);
        setB(b);
    }

    public void setA(double a)
    {
        if (a>0)
            this.a = a;
        else
        {
            System.out.println ("Length must be positive, setting a to 1 ");
            this.a = 1;
        }
    }
    public void setB(double b)
    {
        if (b>0)
            this.b = b;
        else
        {
            System.out.println ("Length must be positive, setting b to 1 ");
            this.b = 1;
        }
    }
    public double getPerimeter()
    {
        return 2 * (a+b);
    }
    public double getArea()
    {
        return a*b;
    }
    public void display()
    {
        System.out.printf("This rectangle has side lengths %.2f and %.2f %n",
            a,b);
        System.out.printf("Area and perimeter are:%.2f and %.2f %n",
            getArea(),getPerimeter());
    }
}
```