

# **SOLID PRINCIPLES ASSIGNMENT**

# Question

**Identify how the following code violates the Liskov Substitution Principle? Also, correct the code in order it to be correct as per the Liskov Substitution Principle.**

**Code:**

```
class Rectangle{
    int m_width;
    int m_height;

    public void setWidth(int width){
        m_width = width;
    }

    public void setHeight(int h) {
        m_height = h;
    }

    public int getWidth() {
        return m_width;
    }
}
```

```
public int getHeight() {
    return m_height;
}

public int getArea() {
    return m_width * m_height;
}
}

class Square extends Rectangle {
    public void setWidth (int width) {
        m_width = width;
        m_height = width;
    }

    public void setHeight (int height) {
        m_width = height;
        m_height = height;
    }
}
```

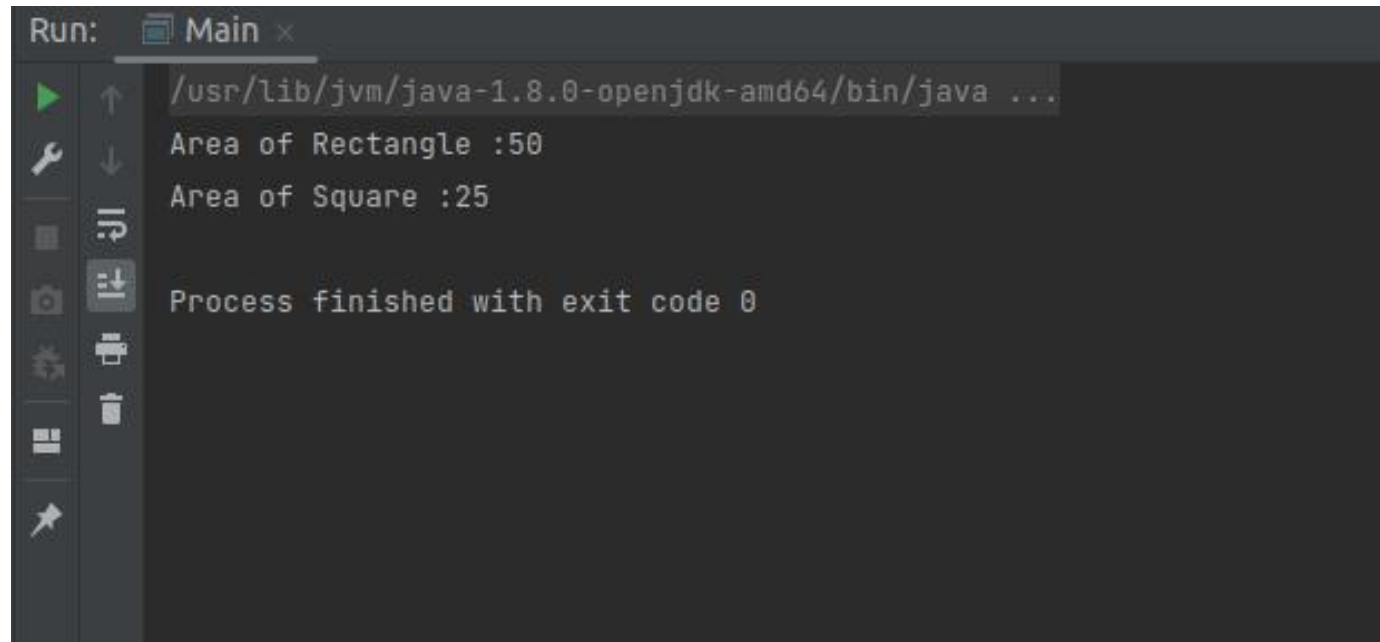
# Solution

```
3 usages 1 inheritor
1 class Rectangle{
    4 usages
2     int width;
    4 usages
3     int height;
    1 usage
4     public void setWidth(int width){
5         this.width = width;
6     }
    1 usage
7     public void setHeight(int height) {
8         this.height = height;
9     }
    no usages
10    public int getWidth() {
11        return this.width;
12    }
    no usages
13    public int getHeight() {
14        return this.height;
15    }
    2 usages
16    public int getArea() {
17        return this.width * this.height;
18    }
19 }
    2 usages
20 class Square extends Rectangle{
    1 usage
21     public void setSquareSide(int side){
22         width = side;
23         height = side;
24     }
25 }
```

# Solution

```
26  /*Main Class of Java*/  
    no usages  
27  ▶ public class Main {  
    no usages  
28  ▶  public static void main(String[] args) {  
29      Rectangle rectangleObj = new Rectangle();  
30      rectangleObj.setHeight(10);  
31      rectangleObj.setWidth(5);  
32      System.out.println("Area of Rectangle :" +rectangleObj.getArea());  
33  
34      Square squareObj=new Square();  
35      squareObj.setSquareSide(5);  
36      System.out.println("Area of Square :" +squareObj.getArea());  
37  
38  }  
39  }  
40  
41
```

# Output



The screenshot shows an IDE's Run console. At the top, it says 'Run: Main x'. Below this, the command `/usr/lib/jvm/java-1.8.0-openjdk-amd64/bin/java ...` is shown. The output consists of two lines: `Area of Rectangle :50` and `Area of Square :25`. At the bottom, it states `Process finished with exit code 0`. On the left side of the console, there is a vertical toolbar with icons for running, debugging, and other IDE functions.

```
Run: Main x
/usr/lib/jvm/java-1.8.0-openjdk-amd64/bin/java ...
Area of Rectangle :50
Area of Square :25
Process finished with exit code 0
```

# THANK YOU