

SOLID Principles Assignment

**By: Akash Singh
Employee Code: 1874**

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

File Name: Rectangle.java

```
1  // This code defines two classes: Rectangle and Square using SOLID principles.
2
3  class Rectangle {
4      int m_width;
5      int m_height;
6
7      public void setWidth(int width) {
8          m_width = width;
9      }
10
11     public void setHeight(int height) {
12         m_height = height;
13     }
14
15     public int getWidth() {
16         return m_width;
17     }
18
19     public int getHeight() {
20         return m_height;
21     }
22
23     public int getArea() {
24         return m_width * m_height;
25     }
26 }
27
28 class Square extends Rectangle {
29
30     public void set_square_side(int side) {
31         m_width = side;
32         m_height = side;
33     }
34 }
```

File Name: Main.java

```
J Rectangle.java  J Main.java x
J Main.java > ...
1  import java.util.Scanner;
2
3  // This code defines the main method for a program that calculates the area of a rectangle and a square.
4  public class Main {
5      Run | Debug
6      public static void main(String[] args) {
7          try (Scanner sc = new Scanner(System.in)) {
8              Rectangle object = new Rectangle();
9              System.out.println("\nEnter the height of rectangle: ");
10             object.setHeight(sc.nextInt());
11
12             System.out.println("\nEnter the width of rectangle: ");
13             object.setWidth(sc.nextInt());
14
15             System.out.println("\nArea of rectangle is: " + object.getArea());
16
17             Square object2 = new Square();
18             System.out.println("\nEnter the side of square: ");
19             object2.set_square_side(sc.nextInt());
20
21             System.out.println("\nArea of square is: " + object2.getArea());
22         }
23     }
24 }
```


Output:

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL

knoldus@knoldus-Vostro-3590:~/Workspace/vscode$ /usr/bin/env /usr/lib/jvm/java-11-0915552/bin Main

Enter the height of rectangle:
10

Enter the width of rectangle:
30

Area of rectangle is: 300

Enter the side of square:
20

Area of square is: 400
knoldus@knoldus-Vostro-3590:~/Workspace/vscode$
```

Thank You