SOLID Principles Assignment

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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

```java
// This code defines two classes: Rectangle and Square using SOLID principles.

class Rectangle {
    int m_width;
    int m_height;

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

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

    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 set_square_side(int side) {
        m_width = side;
        m_height = side;
    }
}
```

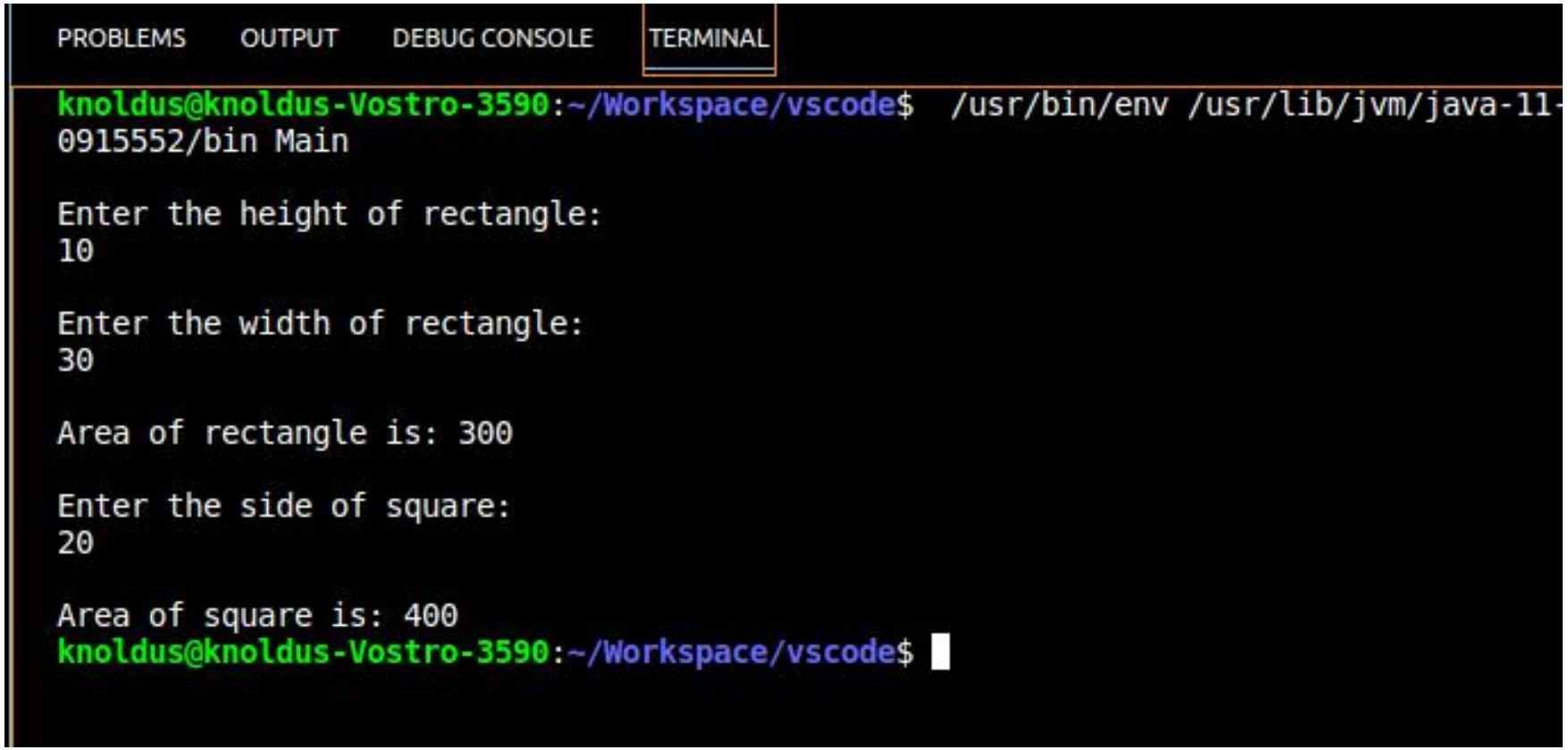
File Name: Main.java

Rectangle.java | Main.java

Main.java > ...

```java
import java.util.Scanner;

// This code defines the main method for a program that calculates the area of a rectangle and a square.
public class Main {
    Run | Debug
    public static void main(String[] args) {
        try (Scanner sc = new Scanner(System.in)) {

            Rectangle object = new Rectangle();
            System.out.println("\nEnter the height of rectangle: ");
            object.setHeight(sc.nextInt());

            System.out.println("\nEnter the width of rectangle: ");
            object.setWidth(sc.nextInt());

            System.out.println("\nArea of rectangle is: " + object.getArea());

            Square object2 = new Square();
            System.out.println("\nEnter the side of square: ");
            object2.set_square_side(sc.nextInt());

            System.out.println("\nArea of square is: " + object2.getArea());
        }
    }
}
```

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$

GitHub Repo link:

https://github.com/akash01847/SOLID_Principles_Assignment.git

Thank You