Problem 10\SierpinskiTriangle.java

```java
1  import javax.swing.*;
2  import java.awt.*;
3
4  public class SierpinskiTriangle extends JPanel {
5
6      // Function to draw the Sierpinski triangle
7      public void drawSierpinski(Graphics g, int depth, int x1, int y1, int x2, int y2, int x3,
   int y3) {
8          if (depth == 0) {
9              // Base case: Draw the triangle
10             g.fillPolygon(new int[]{x1, x2, x3}, new int[]{y1, y2, y3}, 3);
11         } else {
12             // Recursive case: Divide the triangle into three smaller triangles
13             int midX1 = (x1 + x2) / 2;
14             int midY1 = (y1 + y2) / 2;
15             int midX2 = (x2 + x3) / 2;
16             int midY2 = (y2 + y3) / 2;
17             int midX3 = (x3 + x1) / 2;
18             int midY3 = (y3 + y1) / 2;
19
20             // Recursively draw the three smaller triangles
21             drawSierpinski(g, depth - 1, x1, y1, midX1, midY1, midX3, midY3);
22             drawSierpinski(g, depth - 1, midX1, midY1, x2, y2, midX2, midY2);
23             drawSierpinski(g, depth - 1, midX3, midY3, midX2, midY2, x3, y3);
24         }
25     }
26
27     @Override
28     protected void paintComponent(Graphics g) {
29         super.paintComponent(g);
30         int depth = 5; // You can change the depth for more/less detail
31         int width = getWidth();
32         int height = getHeight();
33
34         // Define the points of the main triangle (equilateral)
35         int x1 = width / 2;
36         int y1 = 50;
37         int x2 = 50;
38         int y2 = height - 50;
39         int x3 = width - 50;
40         int y3 = height - 50;
41
42         // Draw the Sierpinski triangle
43         drawSierpinski(g, depth, x1, y1, x2, y2, x3, y3);
44     }
45
46     public static void main(String[] args) {
47         JFrame frame = new JFrame();
48         SierpinskiTriangle panel = new SierpinskiTriangle();
49         frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
50         frame.setSize(800, 800);
51         frame.add(panel);
```

```
52            frame.setVisible(true);
53        }
54    }
55
```