

```
import java.awt.*;
import java.awt.event.*;
import java.awt.image.*;
import javax.swing.*;
import javax.swing.border.*;
import java.util.*;

/**
 * FractalTree - 1030 GUI Demonstration.
 *
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 */
public class FractalTree extends JFrame
{
    public static void main(String[] args)
    {
        FractalTree jframe = new FractalTree();
        jframe.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        jframe.setTitle("Fractal");
        jframe.pack();
        jframe.setVisible(true);
    }

    /*
     * some constants
     */
    static final int PANEL_WIDTH = 500;
    static final int PANEL_HEIGHT = 400;

    // this is the JPanel where we'll draw the fractal
    DrawPanel drawpanel;

    /*
     * the constructor for our JFrame object
     */
    public FractalTree()
    {
        /*
         * construct and configure GUI components
         */
        drawpanel = new DrawPanel();
        drawpanel.setBackground(Color.WHITE);
        drawpanel.setPreferredSize(new Dimension(PANEL_WIDTH, PANEL_HEIGHT));
        drawpanel.setMaximumSize(new Dimension(PANEL_WIDTH, PANEL_HEIGHT));

        // make paint panel this JFrame's content pane
        setContentPane(drawpanel);
    }

    /*
     * This inner class extends JPanel
     *
     * this is where we do our drawing...
     */
    class DrawPanel extends JPanel
    {

```

```
// constructor
public DrawPanel()
{
    super();
}

void drawTree(Graphics g, double x1, double y1, double angle, double depth)
{
    if(depth < 0.5)
        return;

    double x2 = x1 + Math.cos(angle) * depth * 4.0;
    double y2 = y1 + Math.sin(angle) * depth * 4.0;
    g.drawLine((int)x1, (int)y1, (int)x2, (int)y2);

    drawTree(g, x2, y2, angle - 0.35, depth - 1);
    drawTree(g, x2, y2, angle + 0.35, depth - 1);
}

// do our drawing...
public void paintComponent(Graphics g)
{
    super.paintComponent(g);

    g.setColor(Color.BLACK);
    drawTree(g, 250, 400, -Math.PI/2, 13);
}
}
```