**Sketching**

Our first example was just a static drawing. Time to learn about *interactive* computer graphics. This means learning about **events**. Here is a little canvas you can sketch on, with a little main method so it can be run as an application:



Drawing Panel

import java.awt.BorderLayout;

import java.awt.Point;

import java.awt.event.MouseAdapter;

import java.awt.event.MouseEvent;

import java.awt.event.MouseMotionAdapter;

import java.awt.Graphics;

import java.io.Serial;

import java.util.ArrayList;

import java.util.List;

import javax.swing.SwingUtilities;

import javax.swing.JFrame;

import javax.swing.JPanel;

public class CodeXam extends JPanel { //The drawing is defined to be a JPanel, which comes from the package javax.swing. A JPanel is a component you can draw in.

/\*

    \*Simply put, we use the serialVersionUID attribute to remember versions of a Serializable class to verify that a loaded class and the serialized object are compatible.

    \*The serialVersionUID attributes of different classes are independent. Therefore, it is not necessary for different classes to have unique values

    \*A serializable class can declare its own serialVersionUID explicitly by declaring a field named serialVersionUID that must be static, final, and of type long

    \*It is not necessary for two classes to have unique values. It means two different classes can have same serialVersionUID value\*/

    @Serial

    private static final long serialVersionUID = - 43L; //components have a silly serial version UID. Just put one in.

    private final List<List<Point>> curves = new ArrayList<>();

    public CodeXam() {

        // Register event listeners on construction of the panel.

        addMouseListener(new MouseAdapter() {

            public void mousePressed(MouseEvent e) {

                var newCurve = new ArrayList<Point>();

                newCurve.add(new Point(e.getX(), e.getY()));

                curves.add(newCurve);

            }

        });

        /\*You can read the component’s current size at any time with the graphics object’s getWidth() and getHeight() methods.

        Often, but not always, you’re drawing will be relative to these values.\*/

        addMouseMotionListener(new MouseMotionAdapter() {

            public void mouseDragged(MouseEvent e) {

                curves.get(curves.size() - 1).add(new Point(e.getX(), e.getY()));

                /\*\*

                 \* The panel saves the state of the drawing as a list of curves, where each curve is a list of points.

                 \* Pressing the mouse button starts a new curve; dragging the mouse adds the current location of the mouse to the current curve.

                 \* The entire drawing is rendered when needed, as usual, in paintComponent().

                 \*Notice the call to repaint when dragging. This tells Java to redraw the panel as soon as it can.

                 \*/

                repaint(0, 0, getWidth(), getHeight()); //The upper-left corner of the component is at (0,0). x-coordinates extend to the right; y-coordinates extend to the bottom.

            }

        });

    }

    public void paintComponent(Graphics g) {

        super.paintComponent(g);

        for (var curve: curves) {

            var previousPoint = curve.get(0);

            for (var point: curve) {

                g.drawLine(previousPoint.x, previousPoint.y, point.x, point.y);

                previousPoint = point;

            }

        }

    }

    /\*\*

     \* A little driver in case you want to sketch as a stand-alone application.

     \* We stuck a main method in there only so we can easily see the panel.

     \* In practice, we should make components just do their own thing,

     \* then write a separate application class with a main method.

     \*/

    public static void main(String[] args) { //

        SwingUtilities.invokeLater(() -> {

            var frame = new JFrame("Simple Sketching Program");

            frame.getContentPane().add(new CodeXam(), BorderLayout.CENTER);

            frame.setDefaultCloseOperation(JFrame.EXIT\_ON\_CLOSE);

            frame.setSize(400, 300);

            frame.setVisible(true);

        });

    }

}

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