

GUI Using Swing

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JFrame

Swing is used to create graphical applications and graphical user interfaces (GUI). These applications are displayed inside a frame, which is created using the JFrame class, accessible from the package `javax.swing`.¹ The frame is a window with a title bar. Graphics can then be added to the frame using `JComponent` class.

JComponent

Graphics cannot be drawn directly on a frame; a component object must be constructed and then added to the frame. To do this, the `JComponent` class is used. `JComponent` is extended by another class², which can then implement the `paintComponent` method³. This method is where drawing instructions go.

Other components that can be added to frames include `JButton`⁴, `JPanel`⁵, `JLabel`, `JTextField`⁶, `JRadioButton`, and `JScrollPane`, just to name a few. As an example, `JButtons` are, as the name implies, buttons, and can be added to a `JPanel` so that the buttons do not overlap.

Layout

Panels and frames can be arranged using their layout managers. Flow layout is arranged from left to right, and creates a new row when one has no more room. Border layout groups components into five areas labeled: center, north, west, south, and east⁷. A grid layout arranges components in a grid with a fixed number of rows and columns. The default layout for panels is flow layout, and the default for frames is border layout.

Example

```
import javax.swing.JComponent;
import java.awt.Graphics;
import java.awt.Graphics2D;
import java.awt.Rectangle;

public class ComponentClass extends JComponent2 {

    public void paintComponent(Graphics g)3{
        super.paintComponent(g);
        Graphics2D g2 = (Graphics2D)g;
        Rectangle box = new Rectangle(10,10,30,20);
        g2.draw(box);
        g2.drawString("It's a box!", 70, 30);
    }
}
```

```
import java.awt.BorderLayout;

import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.JTextField;

public class SwingDemo {
    public static void main(String[] args){
        JFrame frame = new JFrame();1

        frame.setSize(500,200);
        frame.setTitle("Rectangle");
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

        JPanel panel = new JPanel();5

        JButton button = new JButton("Click Me!");4
        JButton button2 = new JButton("Click Me Too!");

        panel.add(button);
        panel.add(button2);

        JTextField text = new JTextField();6

        ComponentClass component = new ComponentClass();
        frame.add(component);
        frame.add(panel, BorderLayout.EAST7);
        frame.add(text, BorderLayout.SOUTH7);

        frame.setVisible(true);
    }
}
```