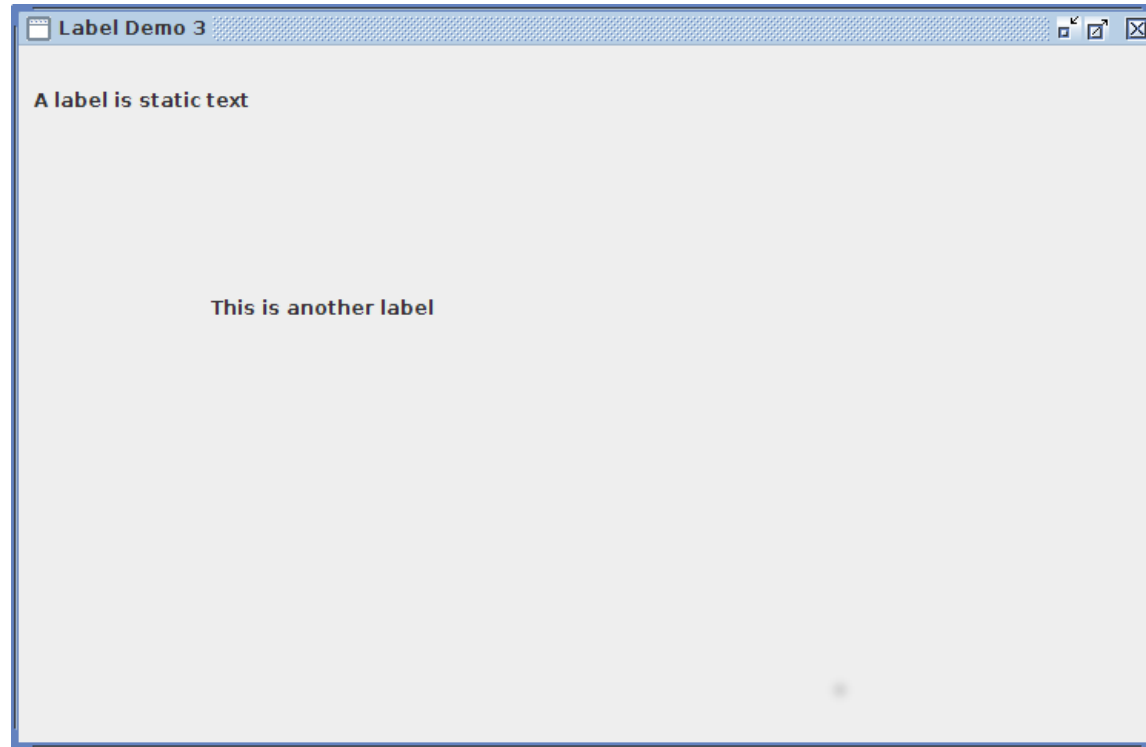# 3. GUI Programming :: Java Layout Managers

The problem with absolute positioning of GUI components is that when the containing *JFrame* is resized the components do not move appropriately.

Although this behavior may be desirable for some applications, in other situations we may wish for the locations and sizes of the components to be **relative** to the size of the *JFrame*. AWT and Swing **Layout managers** provide that functionality.

3. GUI Programming :: Java Layout Managers :: *FlowLayout*

The default layout manager is *java.awt.FlowLayout* which arranges components in a directional flow like words in a paragraph. The default flow is left-to-right but this can be changed to right-to-left. When there is no more room on a "line" for the next component, it will be placed on the next "line".

```java
// FlowLayoutDemo.java
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JPanel;
public class FlowLayoutDemo1 {
    public static void main(String[] args) { new FlowLayoutDemo1().run(); }
    public void run() {
        JFrame.setDefaultLookAndFeelDecorated(true);
        JPanel panel = new JPanel();
        JLabel label1 = new JLabel("This is label 1");
        JLabel label2 = new JLabel("This is label 2");
        JLabel label3 = new JLabel("This is label 3");
        JLabel label4 = new JLabel("This is label 4");
        panel.add(label1); panel.add(label2); panel.add(label3); panel.add(label4);
        JFrame frame = new JFrame("Flow Layout Demo 1");
        frame.setSize(400, 300);
        frame.add(panel);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setVisible(true);
    }
}
```

3. GUI Programming :: Java Layout Managers :: *FlowLayout* (continued)

All layout managers automatically rearrange the components when the *JFrame* is resized: