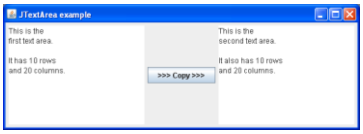
CS 325 - Class 21

- Today
  - – Java's Swing library
  - – Text areas, scroll panes, sliders
  - – Fonts, polygons, more about colors
- Announcements
  - – Continue working on Project 4

JTextArea

- A text area is essentially just a 2-dimensional text box
  - – Has both rows and columns



This is the
first text area.

It has 10 rows
and 20 columns.

This is the
second text area.

It also has 10 rows
and 20 columns.

JTextArea example

```
public class ExampleJTextArea {

    public static void main(String[ ] args) {
    JFrame frame = new JFrame("JTextArea example");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    JPanel content = (JPanel)frame.getContentPane();
    content.setLayout(new FlowLayout( ));

    final JTextArea text1 = new JTextArea(10,20);
    JButton copy = new JButton(">>> Copy >>>");
    final JTextArea text2 = new JTextArea(10,20);
    text2.setEditable(false);
```

JTextArea example (cont.)

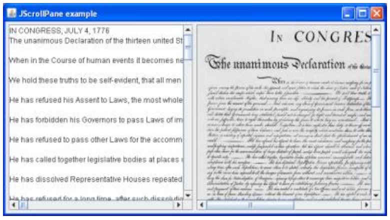
```
    copy.addActionListener(new ActionListener( ) {
          public void actionPerformed(ActionEvent evt) {
                    String str = text1.getText( );
                    text2.setText(str);
                    System.out.print(str);        // for demonstration purposes
          }
    });
    content.add(text1);
    content.add(copy);
    content.add(text2);
    frame.pack( );
    frame.setVisible(true);
  }
}
```

Class Exercise

- Download from **http://cs.ua.edu/325/Summer2007/examples/ExampleJTextArea.java**
- Compile and run
- Add a "Clear" button that erases the contents from either text1 or text2

JScrollPane

- A scroll pane allows you to scroll horizontally or vertically
- This example shows two scroll panes
  - – One containing text, and one containing an image



IN CONGRESS, JULY 4, 1776
The unanimous Declaration of the thirteen united St

When in the Course of human events it becomes ne

We hold these truths to be self-evident, that all men

He has refused his Assent to Laws, the most whole

He has forbidden his Governors to pass Laws of im

He has refused to pass other Laws for the accomm

He has called together legislative bodies at places

He has dissolved Representative Houses repeated

He has refused for a long time, after such dissolutio

JScrollPane example

```
import javax.swing.*;
import java.awt.*;
import java.io.*;
import java.util.*;

public class ExampleJScrollPane {

  public static void main(String[ ] args) {
    JFrame frame = new JFrame("JScrollPane example");
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

    JPanel content = (JPanel)frame.getContentPane( );
    content.setLayout(new FlowLayout( ));
```

JScrollPane example (cont.)

```
    JTextArea text = new JTextArea( );
    text.setEditable(false);
    JScrollPane scroll = new JScrollPane(text);
    scroll.setPreferredSize(new Dimension(300,300));

    try {
          Scanner infile = new Scanner( new File ("Declaration.txt") );
          while ( infile.hasNext( ) ) {
                    String str = infile.nextLine( );
                    text.append( str + "\n" );
          }
    }
    catch ( IOException e) { System.out.println("File error"); }
```

JScrollPane example (cont.)

```
    ImageIcon icon  = new ImageIcon("Declaration.jpg");
    JLabel label = new JLabel(icon);
    JScrollPane scroll2 = new JScrollPane(label);
    scroll2.setPreferredSize(new Dimension(300,300));

    content.add(scroll);
    content.add(scroll2);

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

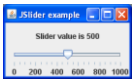
Class Exercise

- Download from **http://cs.ua.edu/325/Summer2007/examples/ExampleJScrollPane.java**
- Also download these files from the same folder:

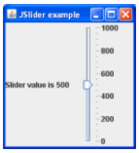
  Declaration.txt, **Declaration.jpg**
- Compile and run
- Change the dimensions of each scroll pane from 300-by-300 to 504-by-608
  - What happens to the second scroll pane?

JSlider

- A slider lets the user graphically select a value by sliding a knob within a bounded interval
  - Can be made to slide either horizontally or vertically



Slider value is 500



Slider value is 500

JSlider example

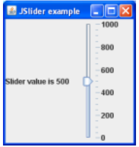
```
public class ExampleJSlider {

  public static void main(String[ ] args) {
  JFrame frame = new JFrame("JSlider example");
  frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
  final JSlider slider = new JSlider(
                    JSlider.HORIZONTAL, 0, 1000, 500);
  slider.setMajorTickSpacing(200);
  slider.setMinorTickSpacing(50);
  slider.setPaintTicks(true);
  slider.setPaintLabels(true);
  final JLabel text = new JLabel("Slider value is " +
                    slider.getValue( ), JLabel.CENTER);
```

JSlider example (cont.)

```
      slider.addChangeListener(new ChangeListener( ) {
           public void stateChanged(ChangeEvent evt) {
              text.setText("Slider value is " + slider.getValue( ));
           }
       });
      JPanel content = (JPanel)frame.getContentPane();
      content.setLayout(new GridLayout(2,1));
      content.add(text);
      content.add(slider);
      frame.pack( );
      frame.setVisible(true);
    }
}
```

Class Exercise

- Download from **http://cs.ua.edu/325/Summer2007/examples/ExampleJSlider.java**
- Compile and run
- Change the horizontal slider to a vertical slider, and make the frame appear like this:



Slider value is 500

More about graphics

- Next we see how to draw graphics that use
  - A wider variety of colors
  - Multiple fonts
  - Polygon shapes

Colors

- Every color can be specified in terms of its red, green, blue coordinates (range 0 to 255)
  - Color.red == Color(255,0,0)
  - Color.green == Color(0,255,0)
  - Color.blue == Color(0,0,255)
  - Color.yellow == Color(255,255,0)
  - Color.cyan == Color(0,255,255)
  - Color.magenta == Color(255,0,255)
  - Color.black == Color(0,0,0)
  - Color.white == Color(255,255,255)
  - Color.gray == Color(128,128,128)
  - Color(160,32,240) yields purple, not a pre-defined color
  - Etc.

Fonts

- Strings can be drawn in a variety of fonts, styles, and sizes
  - Font(“TimesRoman”, Font.BOLD, 16)
  - Font(“SansSerif”, Font.ITALIC, 24)
  - Font(“Monospaced”, Font.PLAIN, 32)
  - Etc.
- Which fonts are actually installed on a particular machine is system-dependent
  - If a font is not installed, Java may attempt to approximate it using an algorithm

Polygons

- A polygon can be formed by specifying its vertex coordinates
  - Polygon triangle = new Polygon( );
  - triangle.addPoint(400,500);
  - triangle.addPoint(400,100);
  - triangle.addPoint(200,500);
- The polygon may then be drawn
  - g.drawPolygon(triangle);
  - g.fillPolygon(triangle);

Graphics example

```
public class ExampleGraphics {

   public static void main(String[ ] args) {
      final JFrame frame = new JFrame("Graphics");
      frame.setDefaultCloseOperation
                         (JFrame.EXIT_ON_CLOSE);
      final MyPicture picture = new MyPicture( );
      picture.setPreferredSize(new Dimension(800,600));
      frame.getContentPane( ).add(picture);
      frame.pack( );
      frame.setVisible(true);
   }
}
```

Graphics example (cont.)

```
class MyPicture extends JComponent {

   public void paintComponent(Graphics g) {

        g.setColor(new Color(160,32,240));        // purple
        Polygon triangle = new Polygon( );
        triangle.addPoint(700,400);
        triangle.addPoint(600,100);
        triangle.addPoint(400,500);
        g.fillPolygon(triangle);
```

Graphics example (cont.)

```
        g.setColor(new Color(60,179,113));   // sea green
        g.setFont(new Font("TimesRoman",Font.ITALIC,72));
        g.drawString("Hello world",100,100);

        g.setColor(new Color(165,42,42));     // brown
        g.setFont(new Font("Monospaced",Font.BOLD,64));
        g.drawString("Goodbye",100,300);

   }
}
```

Class Exercise

- Download from **http://cs.ua.edu/325/Summer2007/examples/ExampleGraphics.java**
- Compile and run
- Change all the parameters
  - RGB values of all three colors
  - Coordinates of the triangle
  - Both fonts (styles and sizes)
  - Locations of both strings