

CS 325 - Class 20

- Today
 - Java's Swing library
 - Review: an example
 - Images
 - Checkboxes, radio buttons
- Announcements
 - Continue working on Project 4

Page 1

Review

- So far we've seen these Java/Swing/AWT concepts:
 - Frames
 - Handling events
 - Drawing graphics
 - Basic GUI components
 - Colors
 - Layout managers
- Now we put them together in a larger example

Page 2

Review: a larger example

- We write a Java program that permits the user to specify the width and height of a rectangle (up to 400-by-400), then draw that rectangle



Page 3

A larger example

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

    final MyComponent picture = new MyComponent( );
    picture.setPreferredSize(new Dimension(401,401));

    JPanel controls = new JPanel( );
    controls.setLayout(new FlowLayout( ));

    // continued on subsequent slides
```

Page 4

A larger example (cont.)

```
controls.add(new JLabel("Enter width:", JLabel.RIGHT));
final JTextField width = new JTextField("0",3);
controls.add(width);

controls.add(new JLabel("Enter height:", JLabel.RIGHT));
final JTextField height = new JTextField("0",3);
controls.add(height);

JPanel content = (JPanel)frame.getContentPane( );
content.setLayout(new BorderLayout( ));
content.add(picture, BorderLayout.CENTER);
content.add(controls, BorderLayout.SOUTH);
```

Page 5

A larger example (cont.)

```
ActionListener action = new ActionListener( ) {
    public void actionPerformed(ActionEvent evt) {
        int w=Integer.parseInt(width.getText( ));
        int h=Integer.parseInt(height.getText( ));
        picture.draw(w,h);
    }
};
height.addActionListener(action);
width.addActionListener(action);
frame.pack( );
frame.setVisible(true);
}
```

Page 6

A larger example (cont.)

```
class MyComponent extends JComponent {  
  
    private int width=0, height=0;  
  
    public void draw(int w, int h) {  
        width=w; height=h;  
        repaint(); // calls paintComponent(), & other things too  
    }  
}
```

Page 7

A larger example (cont.)

```
public void paintComponent(Graphics g) {  
    g.setColor(Color.green);  
    g.fillRect(0, 0, width, height);  
  
    g.setColor(Color.magenta);  
    for (int k=0; k<=4; k++) {  
        g.drawLine(0, 100*k, 400, 100*k);  
        g.drawLine(100*k, 0, 100*k, 400);  
    }  
}
```

Page 8

Class Exercise

- Download from <http://cs.ua.edu/325/Summer2007/examples/Rectangle.java>
- Compile and run
- Change the color of the rectangle to cyan, and the color of the grid to red
- Increase the maximum size of the rectangle from 400-by-400 to 500-by-500
 - Remember to add extra grid lines too

Page 9

Images

- Java recognizes images found in .GIF, .JPG, and .PNG files
- We will use these images in subsequent example programs

Bird.gif



Cat.gif



Dog.gif



Pig.gif



Rabbit.gif



Page 10

JCheckBox

- A check box is a kind of button that toggles between an “on” state and an “off” state



Page 11

JCheckBox example

```
public class ExampleJCheckBox {  
  
    public static void main(String[] args) {  
        JFrame frame = new JFrame("JCheckBox example");  
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);  
  
        JPanel content = (JPanel)frame.getContentPane();  
        content.setLayout(new GridLayout(2,3));  
  
        ImageIcon bird = new ImageIcon("Bird.gif");  
        ImageIcon cat = new ImageIcon("Cat.gif");  
        ImageIcon dog = new ImageIcon("Dog.gif");
```

Page 12

JCheckBox example (cont.)

```
final JCheckBox birdcheck = new JCheckBox("Bird");
final JCheckBox catcheck = new JCheckBox("Cat");
final JCheckBox dogcheck = new JCheckBox("Dog");
```

```
content.add(birdcheck);
content.add(catcheck);
content.add(dogcheck);
```

Page 13

JCheckBox example (cont.)

```
final DrawingArea birdpanel = new DrawingArea(bird);
final DrawingArea catpanel = new DrawingArea(cat);
final DrawingArea dogpanel = new DrawingArea(dog);
```

```
birdpanel.setPreferredSize(new Dimension(140, 140));
catpanel.setPreferredSize(new Dimension(140, 140));
dogpanel.setPreferredSize(new Dimension(140, 140));
```

```
content.add(birdpanel);
content.add(catpanel);
content.add(dogpanel);
```

Page 14

JCheckBox example (cont.)

```
birdcheck.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
        birdpanel.draw( birdcheck.isSelected() );
    }
});
catcheck.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
        catpanel.draw( catcheck.isSelected() );
    }
});
dogcheck.addActionListener(new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
        dogpanel.draw( dogcheck.isSelected() );
    }
});
```

Page 15

JCheckBox example (cont.)

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

```
class DrawingArea extends JComponent {
```

```
    private ImageIcon icon;
    private boolean selected;
```

```
    public DrawingArea(ImageIcon i) { icon = i; }
```

Page 16

JCheckBox example (cont.)

```
public void draw(boolean b) {
    selected = b;
    repaint();
}

public void paintComponent(Graphics g) {
    if (selected)
        icon.paintIcon(this,g,0,0);
}
}
```

Page 17

Class Exercise

- Download from <http://cs.ua.edu/325/Summer2007/examples/ExampleJCheckBox.java>
- Also download these images from the same folder:
Bird.gif, **Cat.gif**, **Dog.gif**, **Pig.gif**, **Rabbit.gif**
- Compile and run
- Add an extra check box to view the pig
– And the rabbit too if you have time

Page 18

JRadioButton

- A radio button is similar to a check box, except:
 - Radio buttons are placed into button groups
 - At most one radio button within each group can be in its “on” state at any given time
- Why are they called radio buttons?



Page 19

JRadioButton example

```
public class ExampleJRadioButton {

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

        JPanel content = (JPanel)frame.getContentPane( );
        content.setLayout(new BorderLayout( ));

        final ImageIcon bird = new ImageIcon("Bird.gif");
        final ImageIcon cat = new ImageIcon("Cat.gif");
        final ImageIcon dog = new ImageIcon("Dog.gif");
```

Page 20

JRadioButton example (cont.)

```
final JRadioButton birdbutton = new JRadioButton("Bird");
final JRadioButton catbutton = new JRadioButton("Cat");
final JRadioButton dogbutton = new JRadioButton("Dog");
```

```
ButtonGroup group = new ButtonGroup( );
group.add(birdbutton);
group.add(catbutton);
group.add(dogbutton);
```

```
JPanel radioPanel = new JPanel(new GridLayout(1, 3));
radioPanel.add(birdbutton);
radioPanel.add(catbutton);
radioPanel.add(dogbutton);
```

Page 21

JRadioButton example (cont.)

```
final DrawingArea picture = new DrawingArea( );
picture.setPreferredSize(new Dimension(500, 500));
```

```
ActionListener action = new ActionListener() {
    public void actionPerformed(ActionEvent evt) {
        if (evt.getSource( ) == birdbutton)
            picture.draw( bird );
        else if (evt.getSource( ) == catbutton)
            picture.draw( cat );
        else if (evt.getSource( ) == dogbutton)
            picture.draw( dog );
    }
};
```

Page 22

JRadioButton example (cont.)

```
birdbutton.addActionListener(action);
catbutton.addActionListener(action);
dogbutton.addActionListener(action);
```

```
content.add(radioPanel, BorderLayout.NORTH);
content.add(picture, BorderLayout.CENTER);
```

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

Page 23

JRadioButton example (cont.)

```
class DrawingArea extends JComponent {
    private ImageIcon icon;

    public void draw(ImageIcon i) {
        icon = i;
        repaint( );
    }

    public void paintComponent(Graphics g) {
        if (icon != null) {
            Image image = icon.getImage( );
            g.drawImage(image, 0, 0, getWidth( ), getHeight( ), this);
        }
    }
}
```

Page 24

Class Exercise

- Download from
<http://cs.ua.edu/325/Summer2007/examples/ExampleJRadioButton.java>
- Also need the same images as before:
Bird.gif, Cat.gif, Dog.gif, Pig.gif, Rabbit.gif
- Compile and run
- Verify that if you resize the window, the image gets automatically resized too
 - This is due to calling `getWidth()` and `getHeight()`
- Add an extra radio button to view the pig
 - And the rabbit too if you have time

Page 25