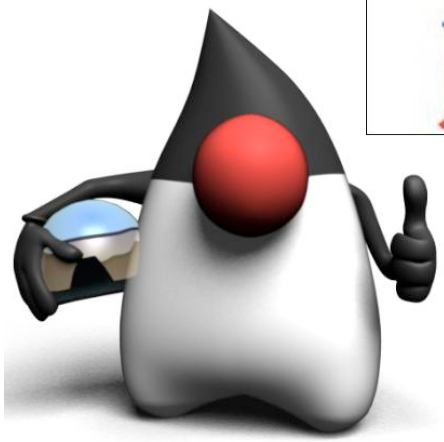
Java as a Second Language

Week 6: Java 2D and 3D



CS3773
Simson Garfinkel

This week:

- enum
- Applets
- Many more Swing classes
- NetBeans GUI builder

You are responsible for these bold, underlined Java Reserved Words.

abstract	**do**	**import**	**short**	volatile
assert	**double**	**instanceof**	**static**	**while**
boolean	**else**	**int**	**strictfp**	
break	enum	**interface**	**super**	
byte	**extends**	**long**	**switch**	
case	**final**	native	synchronized	
catch	**finally**	**new**	**this**	
char	**float**	**package**	**throw**	
class	**for**	**private**	**throws**	
[const]	**[goto]**	**protected**	transient	
continue	**if**	**public**	**try**	
default	**implements**	**return**	**void**	

http://java.sun.com/docs/books/tutorial/java/nutsandbolts/_keywords.html

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Java 5 Enums

We've seen these before:

```
enum Season { WINTER, SPRING, SUMMER, FALL }
```

or:

```
import java.util.*;
public class Card {
    public enum Rank { DEUCE, THREE, FOUR, FIVE, SIX,
        SEVEN, EIGHT, NINE, TEN, JACK, QUEEN, KING, ACE }
    public enum Suit { CLUBS, DIAMONDS, HEARTS, SPADES }
    private final Rank rank;
    private final Suit suit;
    private Card(Rank rank, Suit suit) {
        this.rank = rank;
        this.suit = suit;
    }
```

http://java.sun.com/j2se/1.5.0/docs/guide/language/enums.html

Java Final vs. Finally

Final:

- Value cannot be changed
- Method cannot be overriden

Finally:

- In a try {} catch {} finally {} block
- Code in finally {} always runs, no matter what.

Java "native"

Used to introduce a C/C++/Assembler routine

Share library must be explicitly loaded:

```
public class NativeDemo {
    public native void printText();
    public static void main(String[] args) {
    System.loadLibrary("happy");
    NativeDemo obj = new NativeDemo();
    obj.printText();
    }
}
```

You are not responsible for knowing how to create native methods.

Java Applets:
Running Java programs in a web page

Apples run inside the browser or inside the Applet Viewer (for testing)

The web page:

```
<object  width='300' height='200'>
  <param name="code" value="Week6DemoApplet.class">
  <param name="type" value="application/x-java-applet">
  <param name="codebase" value="directory or jarfile">
</object>
```

The browser:

- Gives Java a small region of the web browser's window
- Starts up a JVM
- Downloads the class from a .class or a .jar file on the web server
- Runs Class.init()

Web6DemoApplet.html:

```
<html>
<title>Week6DemoApplet</title>
<body>
<h1>This is the Week6 Demo Applet</h1>
<object  width='300' height='200'>
  <param name="code" value="Week6DemoApplet.class">
  <param name="type" value="application/x-java-applet">
</object>
</body>
</html>
```

Web6DemoApplet.html:

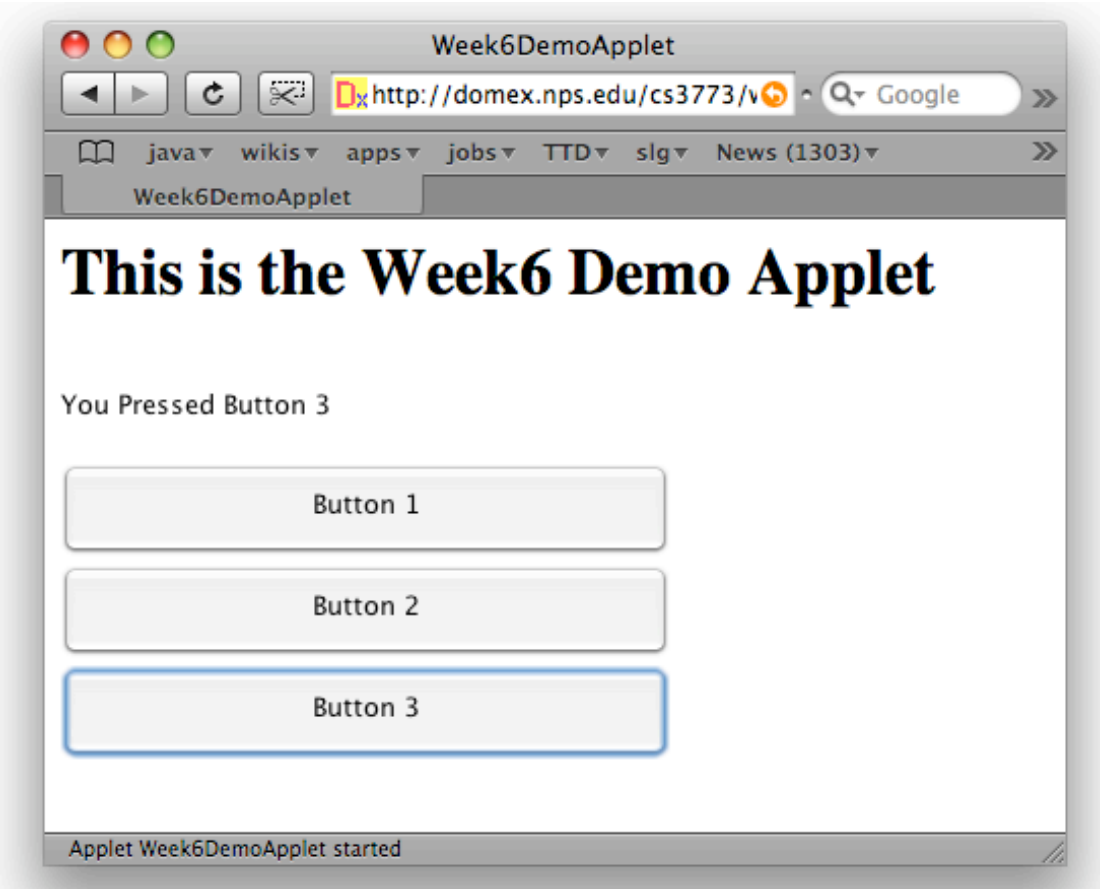
```
import java.awt.*;
import javax.swing.*;
import java.awt.event.*;

public class Week6DemoApplet extends JApplet {
    JLabel myLabel = null;
    public void init() {

        Container content = getContentPane();
        content.setBackground(Color.white);
        content.setLayout(new GridLayout(0,1));
        content.add(myLabel = new JLabel("Please click a button!"));

        for(int i=1;i<=3;i++){
            JButton b = new JButton("Button "+i);
            content.add(b);
            b.addActionListener(new ActionListener() {
                    public void actionPerformed(ActionEvent e){
                        JButton buttonPressed = (JButton)e.getSource();
                        myLabel.setText("You Pressed "+buttonPressed.getText());
                    }
                });
        }
    }
}
```

Week6DemoApplet in action...

http://domex.nps.edu/cs3773/week6/Week6DemoApplet.html

Problems:

- Testing is hard
- Reload doesn't reload the java classes

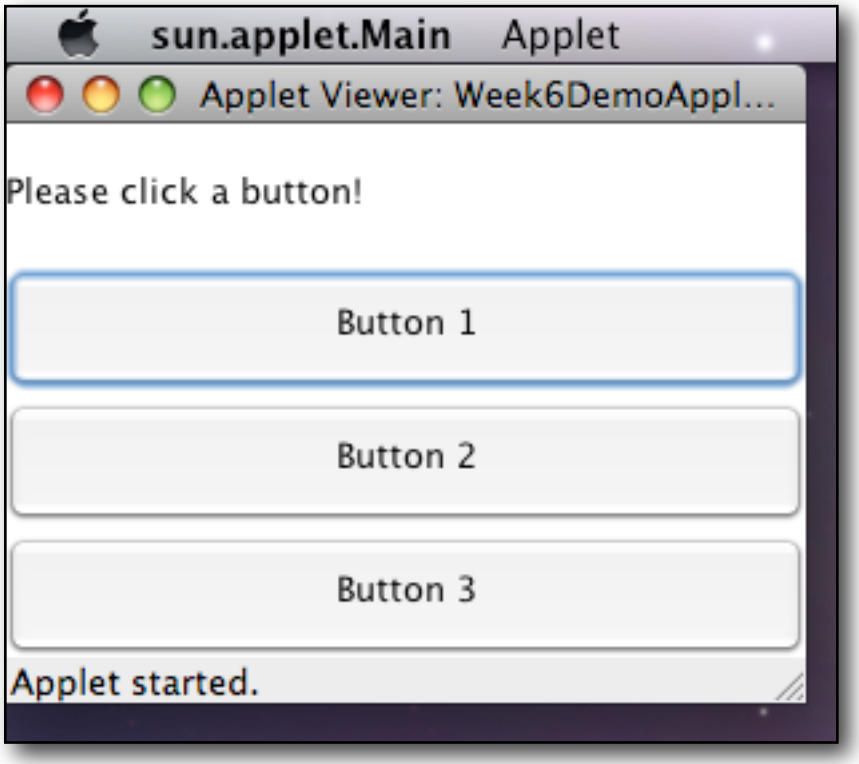


Use AppletViewer for limited testing

Better control.

Easier to see error messages.

usage: % appletviewer webpage.html



Notes on Applets:

You may see <object> or <embed> tags instead of <applet> tags.

- Do not use <objectp> tags! <applet> is the official HTML 4.0 tag
- <applet> has worked since IE 4.0 and all other modern browsers.

You can pass additional parameters:

- <param name="myname" value="myvalue">
- Applet.getParameter("myname");

REVISED

EMBED, OBJECT & APPLET

	EMBED	OBJECT	APPLET
IE		+	+
Firefox Win	needs plug-in		+
Safari	+	+	+
Firefox Mac	needs plug-in		+

REVISED

Applet Security

Applets are limited. They cannot:

- Read or write to the disk.
- Can only access Internet sites from which they were download.

Java supports *Code Signing*

- Digital signatures allow applets to have additional privileges

Applet Lifecycle

HTML is downloaded to web browser

Web browser starts JVM

JVM downloads .class and/or .jar files (.jar files are faster)

- init() — called when applet is loaded
- start() — called when applet starts running
- stop() — called when applet should stop running (not guaranteed)
- paint() — called when applet needs to redraw itself

Applet is an **awt** class.

JApplet is a **swing** class

Java Applets

The problems:

- JVM in the web browser may be old
- Microsoft is not distributing Java

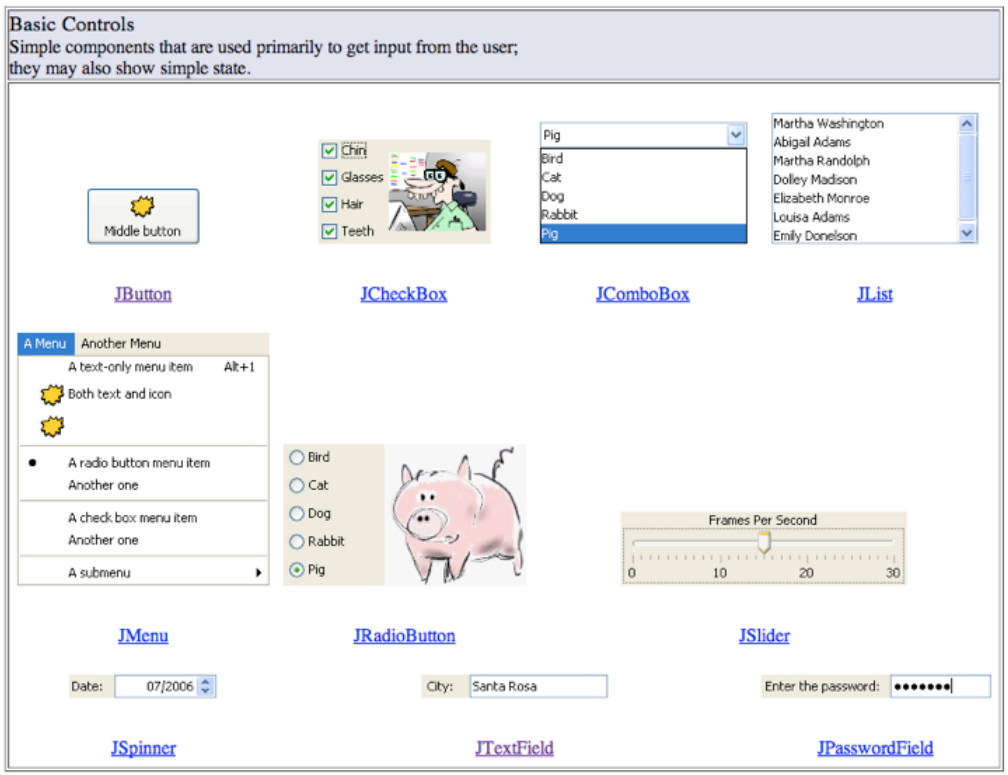
The Solution:

- Sun's Java WebStart
- ActiveX component on Internet Explorer; Plug-in with Mozilla
- Safari on the Mac has its own system.

Swing Components

http://java.sun.com/docs/books/tutorial/ui/features/components.html

http://java.sun.com/docs/books/tutorial/ui/features/compWin.html



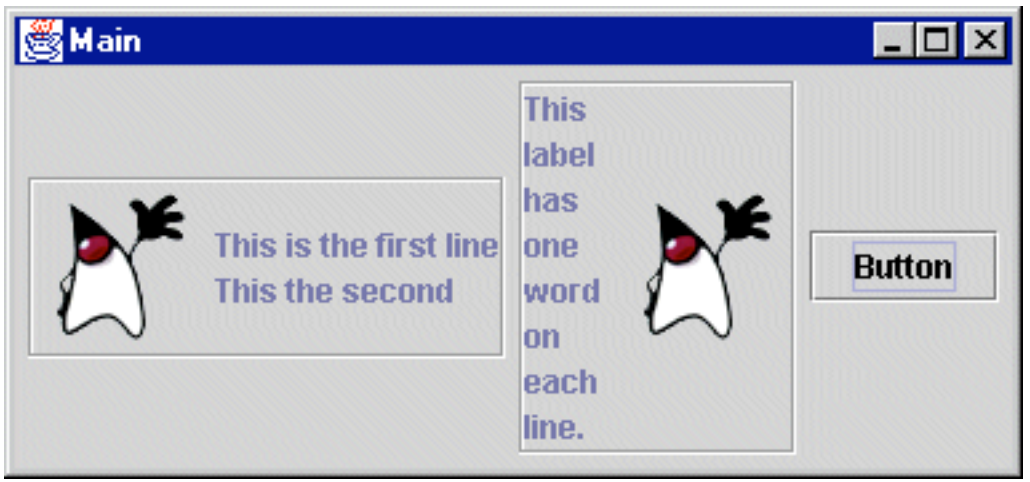
JLabel

Not-editable

Tooltips

Images & Text

HTML



http://www.codeguru.com/java/articles/198.shtml

http://java.sun.com/j2se/1.5.0/docs/api/javax/swing/JLabel.html

JTextField, JPasswordField

Accepts input

Copy & Paste

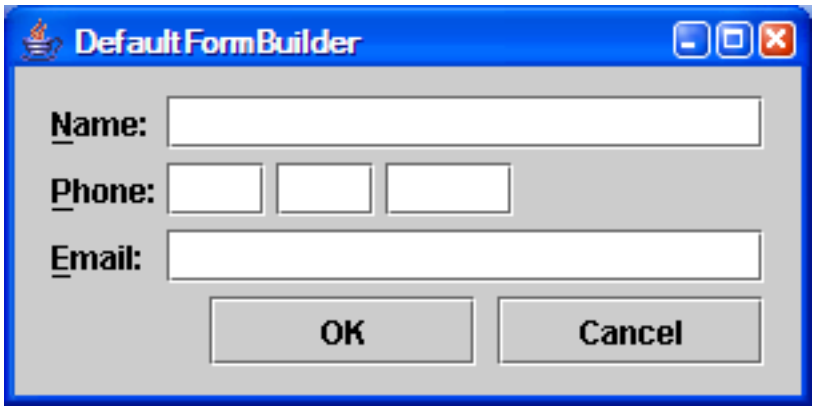
Often paired with a JLabel

Just a single line of text!

Not a full text editor

Events:

- actionPerformed()



http://www.ociweb.com/jnb/defaultFormBuilder.png

http://java.sun.com/j2se/1.5.0/docs/api/javax/swing/JTextField.html

http://java.sun.com/docs/books/tutorial/uiswing/components/textfield.html

JButton

Clickable button

Text

Displayed icons

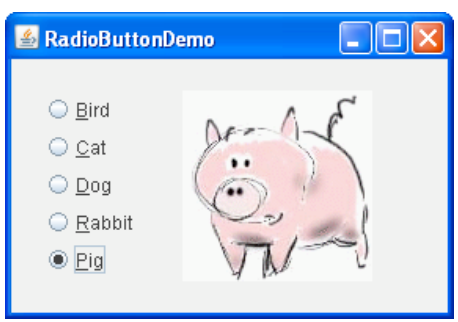
- actionPerformed()

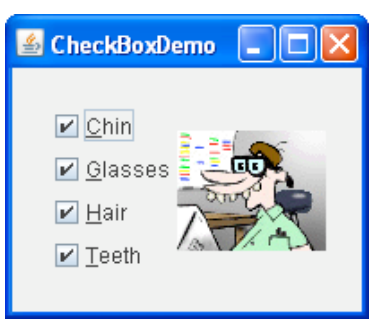
http://java.sun.com/j2se/1.5.0/docs/api/javax/swing/JButton.html

Java Tutorial:
How to Use Buttons, Check Boxes & Radio Buttons

http://java.sun.com/docs/books/tutorial/uiswing/components/button.html

- JButton — A Common Button
- JCheckBox — A check box butotn
- JRadioButton — One of several radio buttons
- JMenuItem — A menu item
- JCheckBoxMenuItem — A menu item with a check box
- JRadioButtonMenuItem
- JToggleButton





JColorChooser

http://java.sun.com/docs/books/tutorial/uiswing/components/colorchooser.html

JComboBox

http://java.sun.com/docs/books/tutorial/uiswing/components/combobox.html