GUI Elements in Java

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GUI Elements

- **Component** ⇒ **items displayed (widgets)**
- **Container** ⇒ **region containing widgets**
- **Layout** ⇒ **arrangement of container**
- **Event** ⇒ **interactions for GUI**

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GUI Elements – Component

- Definition
  - Actual items (widgets) user sees in GUI
- Examples
  - Labels (fixed text)
  - Text areas (for entering text)
  - Buttons
  - Checkboxes
  - Tables
  - Menus
  - Toolbars
  - Etc…

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GUI Elements – Container

- Definition
  - Abstractions occupying space in GUI
- Properties
  - Usually contain one or more widgets
  - Can be nested in other containers
- Example
  - Window containing
    - 1 menu (component)
    - 3 buttons (component)
    - 2 windows (container)

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GUI Elements – Layout

- Definition
  - Arrangement of widgets in container
- Layout specification
  - Logical terms (2nd row, 1st column, left)
    - Preferred approach
  - Actual coordinates (100 pixels, 5 inches)
    - Can be too rigid, limited to certain window sizes
- Layout manager
  - Entity translating layout specifications into actual coordinates at runtime, depending on conditions

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Example Java Layout Managers

- GridLayout
  - Lays out components in a grid of user specified size
- BorderLayout
  - Designates portions of the container as North, South, East, West, and Center
- CardLayout
  - Adds components one on top of another
- GridBagLayout
  - Customizable manager that can use rows and columns of varying lengths

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GUI Elements – Events

- Definition
  - Action or condition occurring outside normal flow of control of program
- Examples
  - Mouse clicks
  - Keyboard input
  - Menu selections
  - Window actions

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Java GUI Classes

- AWT (Abstract Window Toolkit) (java.awt.*)
  - Old GUI framework for Java (Java 1.1)
  - Some reliance on native code counterparts
  - Platform independence problems
- Swing (javax.swing.*)
  - New GUI framework first introduced in Java 1.2
  - Includes AWT features plus many enhancements
  - Pure Java components (no reliance on native code)
  - Pluggable look and feel architecture

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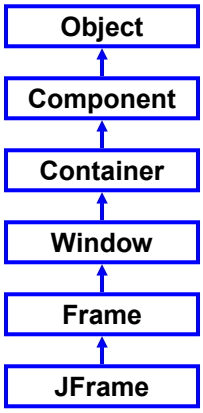
JFrame Hierarchy

- Several super classes and well as implemented interfaces
- Many, many member methods including inherited methods that allow for operations such as resizing, setting properties, adding components, etc.
- Other top level containers
  - JDialog (dialog boxes)
  - JApplet (web applets)
  - JWindow (stripped down JFrame, no title bar or window buttons)



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Java GUI Components

- Examples
  - JFrame
  - JTextfield
  - Jlabel
  - Button
  - JList
  - JComboBox
  - Menu
  - Combo
  - Panes
  - Indicators
  - Dialog boxes
  - JFileChooser
  - Color chooser
  - JTable
  - JTree

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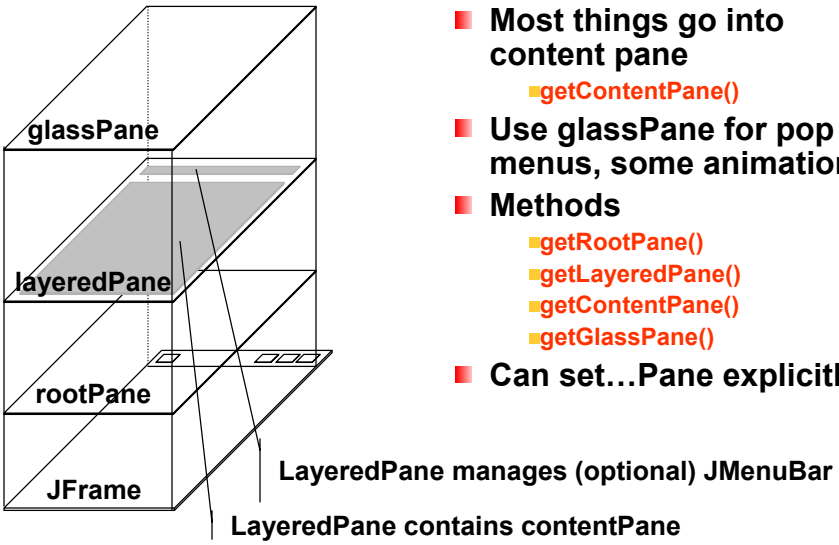
Examples

- Illustrates how to create a JFrame and a JPanel
- Illustrates how we can set a call back to take care of certain mouse events (those associated with MouseListener)
- Example: package example1 of code distribution.
- Example: package example2 – Shows how we can put all together in one class
- Example: package example3 – Shows how two layout managers organize components

JFrame Structure



- Most things go into content pane
  - getContentPane()
- Use glassPane for pop up menus, some animations
- Methods
  - getRootPane()
  - getLayeredPane()
  - getContentPane()
  - getGlassPane()
- Can set…Pane explicitly

JFrame

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JTextField and JLabel

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Buttons

Toolbar

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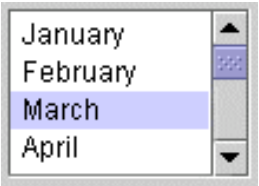
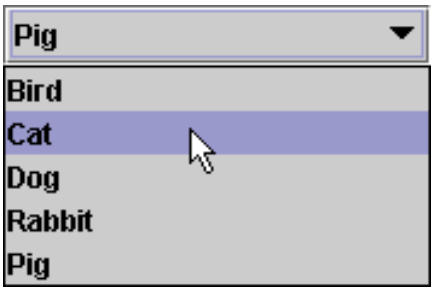
JList and JComboBox





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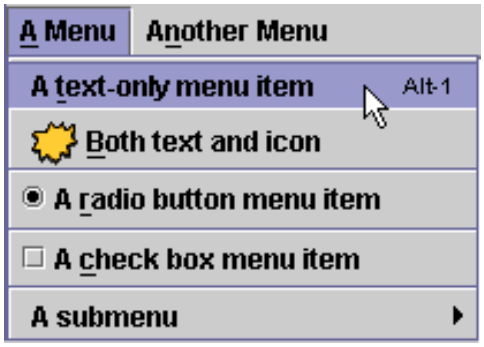
Menu



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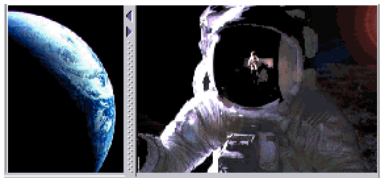
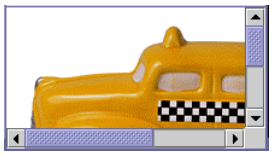
Panels and Panes

Tabbed Pane



Split Pane



Scroll Pane

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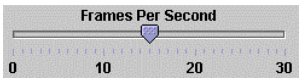
Various Indicators

Spinner



Slider

Progress Bar

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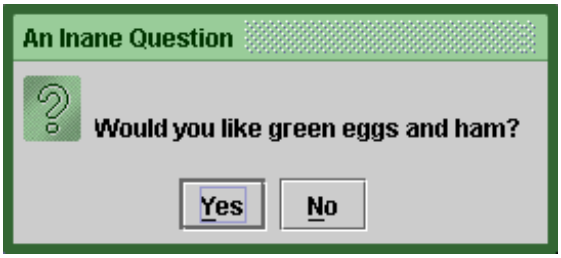
A Dialog Box



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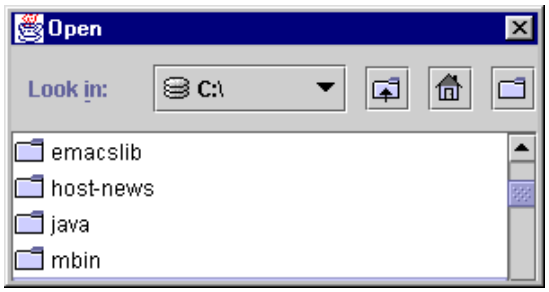
JFileChooser



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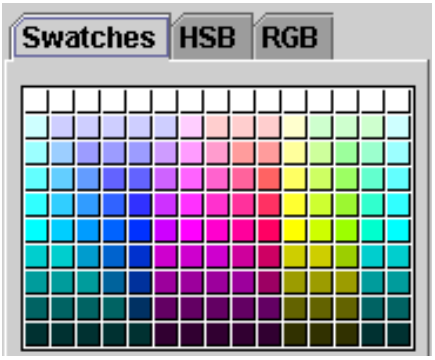
Color Chooser



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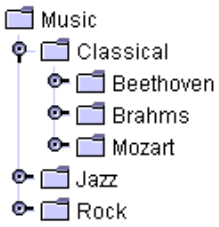
Jtable and JTree

First Name	Last Name	Favorite Food
Jeff	Dinkins	
Ewan	Dinkins	
Amy	Fowler	
Hania	Gajewska	
David	Geary	



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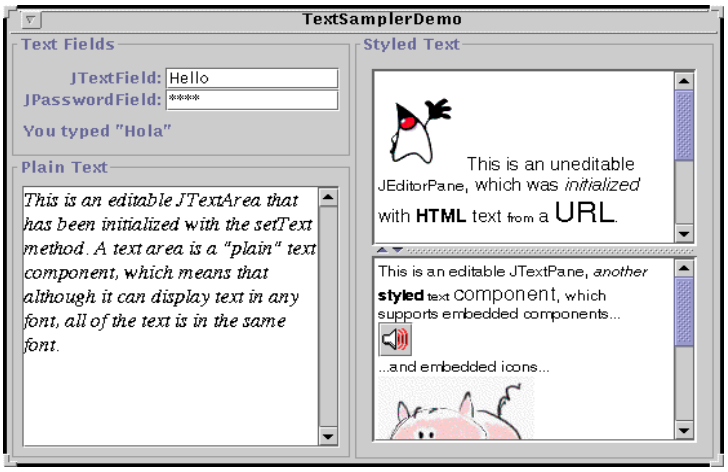
Text Fields



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