

OBJECT ORIENTED PROGRAMMING

Basic GUI Development

by

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Content Overview

- Introduction to GUI-base problem
- Creating and customizing a subclass of JFrame
- NetBeans Form Editor
- Basic GUI components



Learning Objectives

At the end of this topic, Student should be able to:

- Define a subclass of the JFrame class using inheritance concepts
- Create a Graphical User Interface (GUI) using drop-down menu and widget available in the software.



“ Imagine you are given the task of designing an airline reservation system that keeps track of flights for a commuter airline. List the classes you think would be necessary for designing such a system. Describe the data values and methods you would associate with each class you identify.

C.Thomas Wu

Introduction to Object-Oriented Programming


Chapter 1: pg.28

”




**REMEMBER THIS PROBLEM?
HOW WOULD YOU DESIGN THE GUI
OF THIS SYSTEM??**

GUI-BASED PROGRAMS



Implemented in Java using classes from the **javax.swing** and **java.awt** packages



Swing classes – Provide greater compatibility across different operating systems, which are fully implemented in JAVA and behave the same on different operating systems.



AWT classes – implemented by using the native GUI objects of OS.



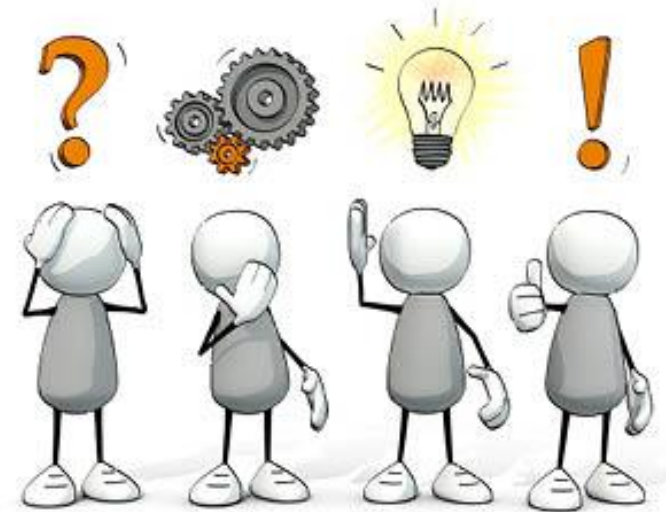
SWING CLASSES VS. AWT CLASSES

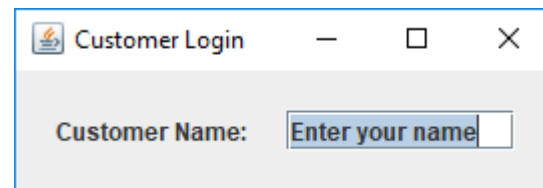
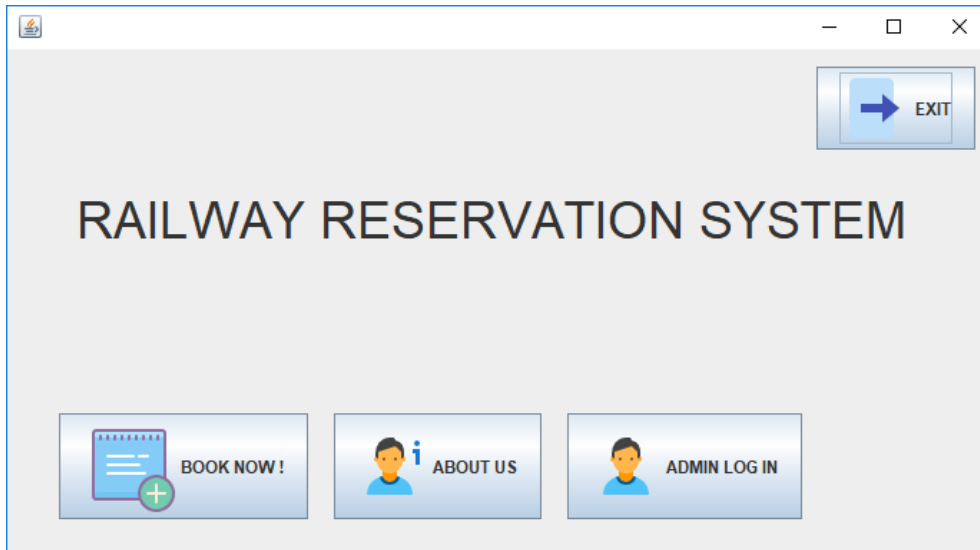
What Are The Differences??





DO NOT MIX Swing and AWT in the **SAME** program because of their differences in implementation





EXAMPLE : GRAPHIC USER INTERFACE (GUI)

NetBeans FORM EDITOR



HOW TO CREATE A JFrame CONTAINER FROM NETBEANS?

1

Right-click the Project node (In Projects window) and choose New > Other

2

Choose Swing GUI Forms category (in New File dialog box) and the JFrame Form file type. Click Next.

3

Enter the class name and the package

4

Click Finish and start creating your own GUI

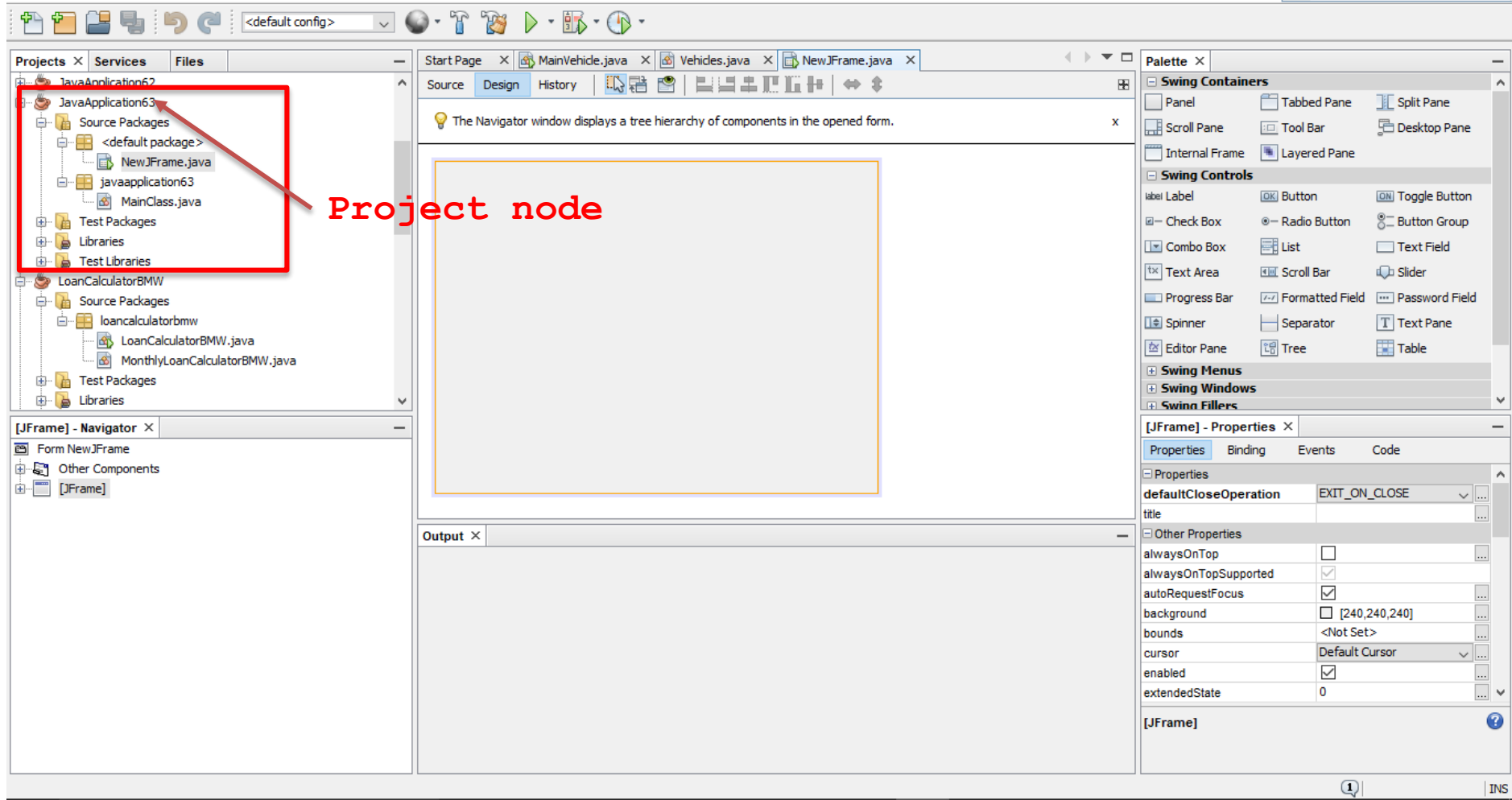


NetBeans FORM EDITOR

JavaApplication63 - NetBeans IDE 8.2

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help

Search (Ctrl+I)



The screenshot displays the NetBeans IDE 8.2 interface. The Project Explorer on the left shows a tree hierarchy for 'JavaApplication63', with a red box highlighting the project node and a red arrow pointing to it labeled 'Project node'. The central area shows a form editor for 'NewJFrame.java' with a light gray design surface. The right side features a Palette with Swing Containers, Swing Controls, and Swing Menus, and a Properties window for the selected 'JFrame' component.

Project node

Palette

- Swing Containers
 - Panel
 - Scroll Pane
 - Internal Frame
 - Tabbed Pane
 - Tool Bar
 - Layered Pane
 - Split Pane
 - Desktop Pane
- Swing Controls
 - label Label
 - OK Button
 - ON Toggle Button
 - Check Box
 - Radio Button
 - Button Group
 - Combo Box
 - List
 - Text Field
 - Text Area
 - Scroll Bar
 - Slider
 - Progress Bar
 - Formatted Field
 - Password Field
 - Spinner
 - Separator
 - Text Pane
 - Editor Pane
 - Tree
 - Table
- Swing Menus
- Swing Windows
- Swing Fillers

[JFrame] - Properties

Properties	Binding	Events	Code
defaultCloseOperation		EXIT_ON_CLOSE	
title			
Other Properties			
alwaysOnTop	<input type="checkbox"/>		
alwaysOnTopSupported	<input checked="" type="checkbox"/>		
autoRequestFocus	<input checked="" type="checkbox"/>		
background	<input type="checkbox"/>	[240,240,240]	
bounds		<Not Set>	
cursor		Default Cursor	
enabled	<input checked="" type="checkbox"/>		
extendedState		0	

NetBeans FORM EDITOR : Jframe Properties & Palette

[JFrame] - Properties

Properties Binding Events Code

Properties

defaultCloseOperation	EXIT_ON_CLOSE	...
title		...

Other Properties

alwaysOnTop	<input type="checkbox"/>	...
alwaysOnTopSupported	<input checked="" type="checkbox"/>	...
autoRequestFocus	<input checked="" type="checkbox"/>	...
background	<input type="checkbox"/> [240,240,240]	...
bounds	<Not Set>	...
cursor	Default Cursor	...
enabled	<input checked="" type="checkbox"/>	...
extendedState	0	...
focusCycleRoot	<input checked="" type="checkbox"/>	...
focusTraversalPolicy	<default>	...
focusTraversalPolicyProvider	<input type="checkbox"/>	...
focusable	<input checked="" type="checkbox"/>	...
focusableWindowState	<input checked="" type="checkbox"/>	...
font	null	...
foreground	null	...
graphics	<none>	...
iconImage	<none>	...
iconImages	<default>	...
insets	[0, 0, 0, 0]	...
location	<Not Set>	...
locationByPlatform	<input type="checkbox"/>	...

Palette

Swing Containers

- Panel
- Tabbed Pane
- Split Pane
- Scroll Pane
- Tool Bar
- Desktop Pane
- Internal Frame
- Layered Pane

Swing Controls

- Label
- Button
- Toggle Button
- Check Box
- Radio Button
- Button Group
- Combo Box
- List
- Text Field
- Text Area
- Scroll Bar
- Slider
- Progress Bar
- Formatted Field
- Password Field
- Spinner
- Separator
- Text Pane
- Editor Pane
- Tree
- Table

Swing Menus

- Menu Bar
- Menu
- Menu Item
- Menu Item / C
- Menu Item / RadioButton
- Popup Menu
- Separator

Swing Windows

- Dialog
- Frame
- Color Chooser
- File Chooser
- Option Pane

Swing Fillers

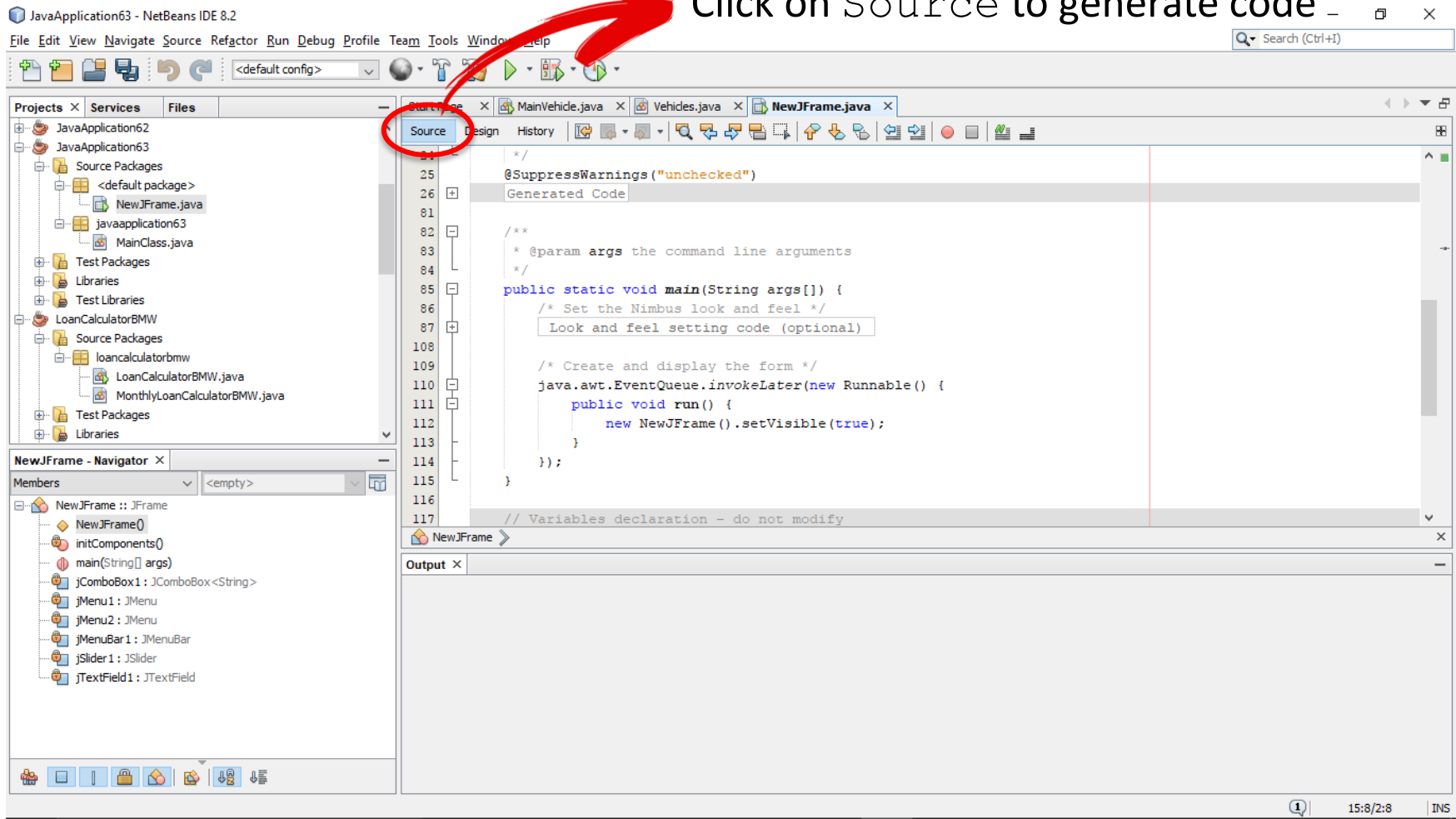
- Glue
- Horizontal Glue
- Horizontal Strut
- Rigid Area
- Vertical Glue
- Vertical Strut

AWT

- Label
- Button
- Text Field
- Text Area
- Checkbox
- Choice
- List
- Scrollbar
- Scroll Pane
- Panel
- Canvas
- Menu Bar
- Popup Menu

NetBeans FORM EDITOR : GENERATE CODE

Click on Source to generate code



The screenshot shows the NetBeans IDE 8.2 interface. The 'Source' tab is selected in the NetBeans Form Editor, and a red arrow points to it. The code editor displays the following Java code:

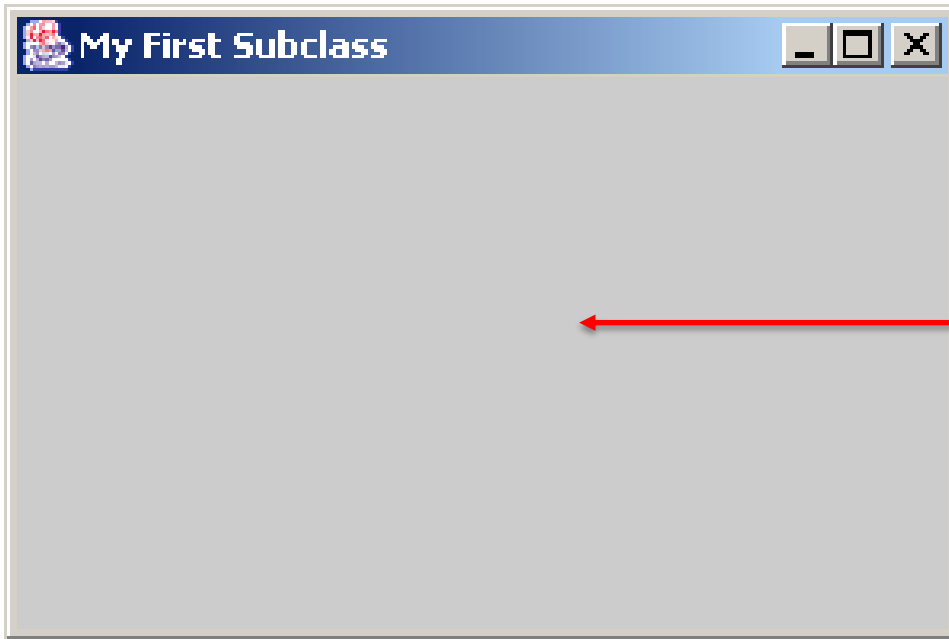
```
25  @SuppressWarnings("unchecked")
26  Generated Code
81
82  /**
83   * @param args the command line arguments
84   */
85  public static void main(String args[]) {
86      /* Set the Nimbus look and feel */
87      Look and feel setting code (optional)
108
109      /* Create and display the form */
110      java.awt.EventQueue.invokeLater(new Runnable() {
111          public void run() {
112              new NewJFrame().setVisible(true);
113          }
114      });
115  }
116
117  // Variables declaration - do not modify
NewJFrame
```

The 'NewJFrame - Navigator' window shows the following members:

- NewJFrame :: JFrame
- NewJFrame()
- initComponents()
- main(String[] args)
- jComboBox1 : JComboBox<String>
- jMenu1 : JMenu
- jMenu2 : JMenu
- jMenuBar1 : JMenuBar
- jSlider1 : JSlider
- jTextField1 : JTextField

The 'Output' window is empty.

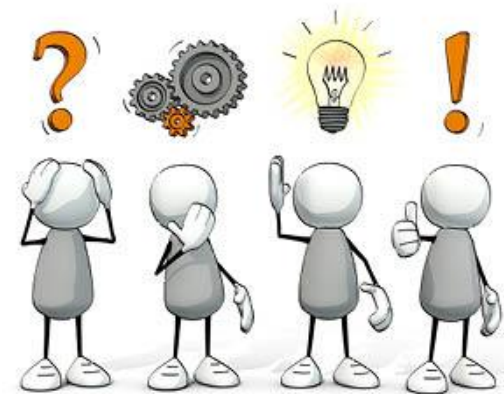
CONTENT PANE : JFRAME



Content Pane :

For GUI objects such as buttons, scroll bars, labels, and others

**WHAT ARE THE DIFFERENCES BETWEEN
JFRAME AND JPANEL?**



USING JBUTTON : CONSTRUCTOR

Constructor	Function
<code>JButton ()</code>	Creates a button with no text or icon
<code>JButton (Icon icon)</code>	Creates a button with an icon
<code>JButton (String text)</code>	Creates a button with text
<code>JButton (String text, Icon icon)</code>	Creates a button with initial text and an icon



USING JBUTTON : METHODS

Methods	Function
addActionListener (Action Listener a)	Register ActionListener to JButton Inherited from AbstractButton
setFont (Font font)	Specifies Font (Type, Style, Size) inherited from JComponent
setBackground (Color color)	Sets background color inherited from JComponent
setActionCommand (String text)	Used to specify button if listener is registered to multiple buttons (see <code>ActionEvent.getActionCommand()</code>)

PALETTE : PLACING JBUTTON

JavaApplication63 - NetBeans IDE 8.2

File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help

Search (Ctrl+I)

Projects Services Files

Start Page MainVehicle.java Vehicles.java NewJFrame.java

Source Design History

To select multiple components in an area hold Shift and drag mouse over the components.

File Edit

jButton1

Palette

- Swing Containers
 - Panel
 - Tabbed Pane
 - Split Pane
 - Scroll Pane
 - Tool Bar
 - Desktop Pane
 - Internal Frame
 - Layered Pane
- Swing Controls
 - OK Button**
 - Toggle Button
 - Check Box
 - Radio Button
 - Button Group
 - Combo Box
 - List
 - Text Field
 - Text Area
 - Scroll Bar
 - Slider
 - Progress Bar
 - Formatted Field
 - Password Field
 - Spinner
 - Separator
 - Text Pane
 - Editor Pane
 - Tree
 - Table
- Swing Menus
 - MenuBar
 - Menu

jButton1 [JButton] - Navigator

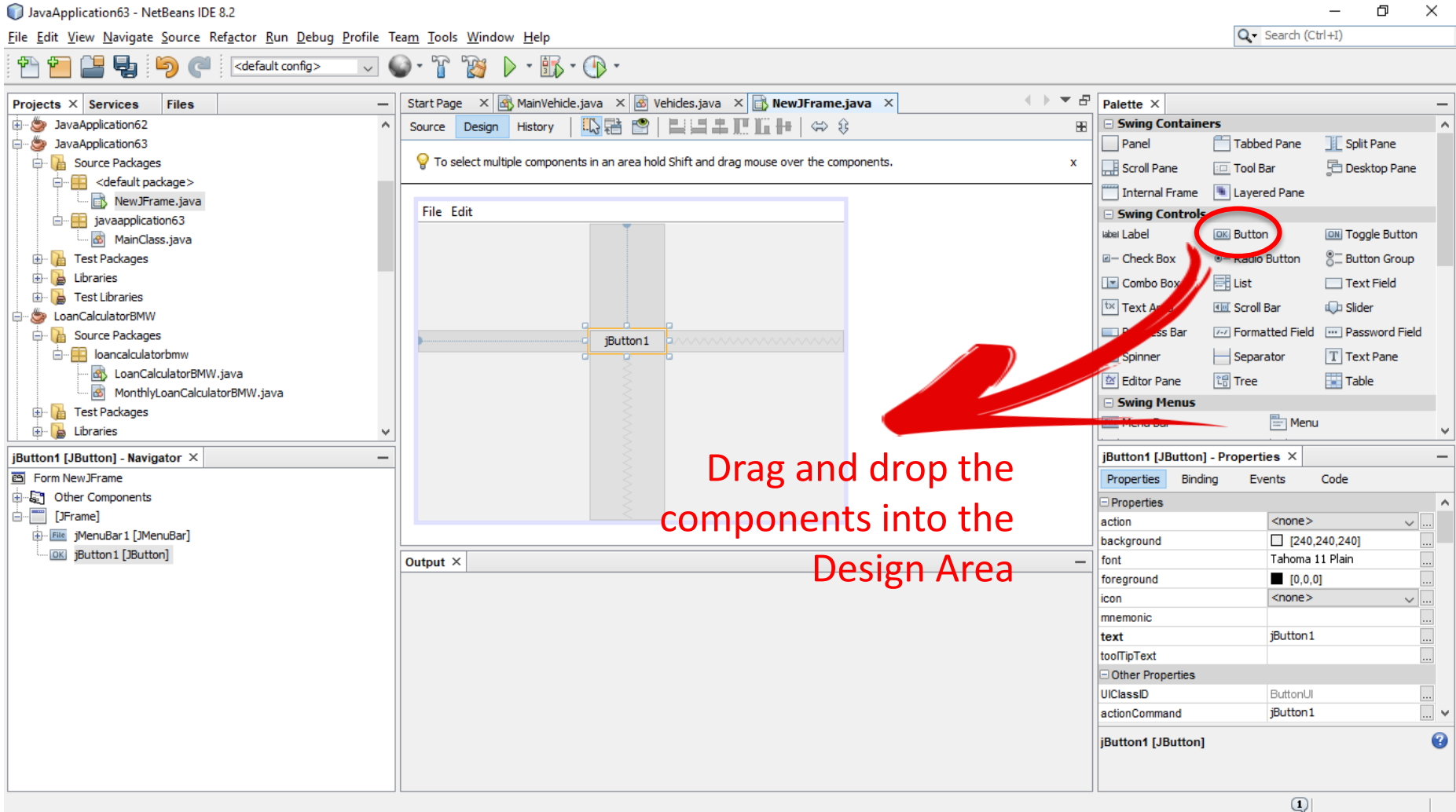
- Form NewJFrame
- Other Components
- [JFrame]
- File jMenuBar1 [JMenuBar]
- OK jButton1 [JButton]

jButton1 [JButton] - Properties

Properties	Binding	Events	Code
action	<none>		
background	<input type="checkbox"/> [240,240,240]		
font	Tahoma 11 Plain		
foreground	<input type="checkbox"/> [0,0,0]		
icon	<none>		
mnemonic			
text	jButton1		
toolTipText			
Other Properties			
UIClassID	ButtonUI		
actionCommand	jButton1		

jButton1 [JButton]

Drag and drop the components into the Design Area



BASIC GUI COMPONENTS

JLabel

- Display uneditable text or icons

TextField

- Enables user to enter data from the keyboard. Can also be used to display editable or uneditable text

JButton

- Triggers an event when clicked with the mouse

JCheckBox

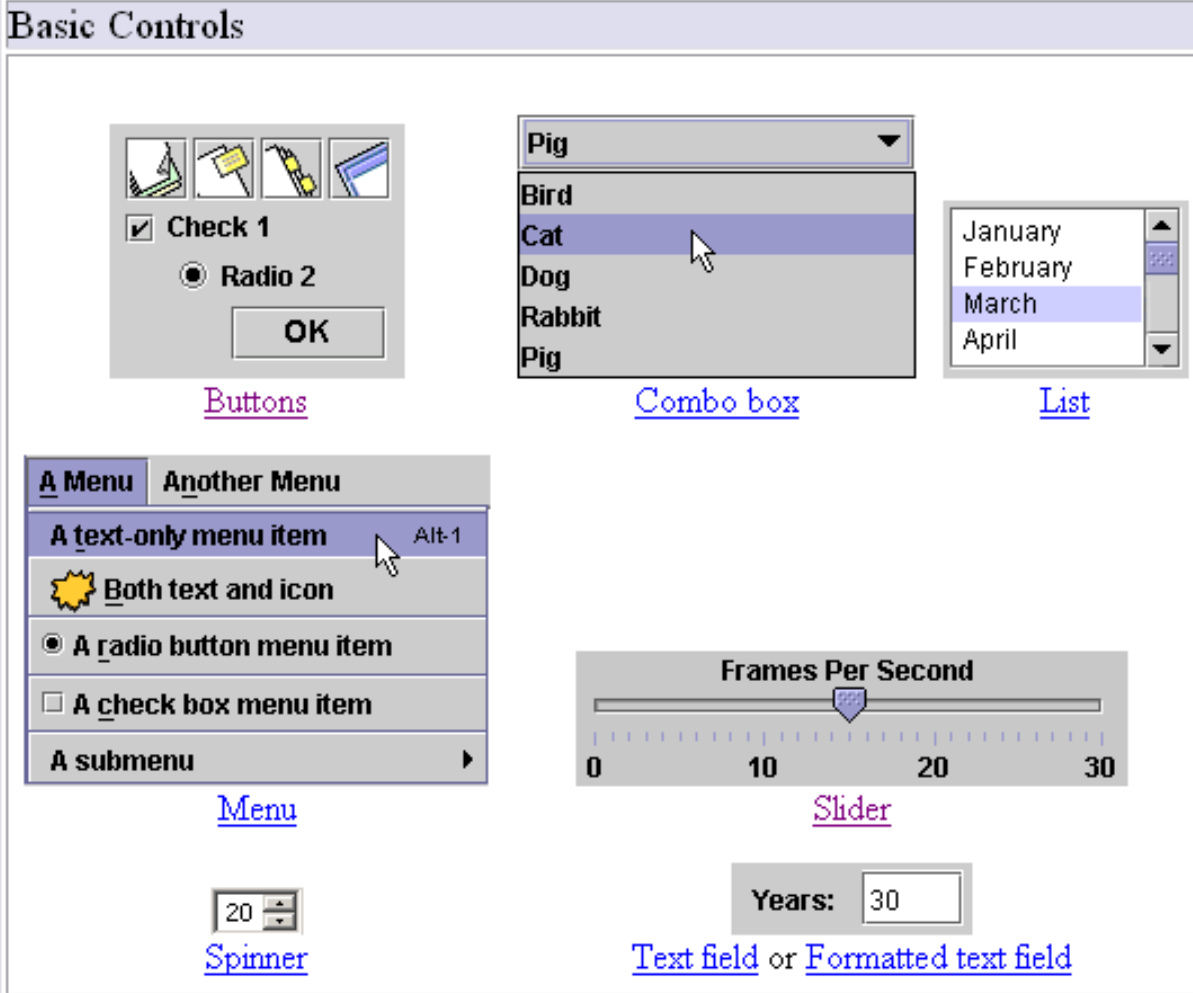
- Specifies an option that can be selected or not selected

JComboBox

- Provides a drop-down list of items from which the user can make a selection by clicking an item or possible by typing into the box

BASIC GUI : SWING COMPONENTS

Basic Controls

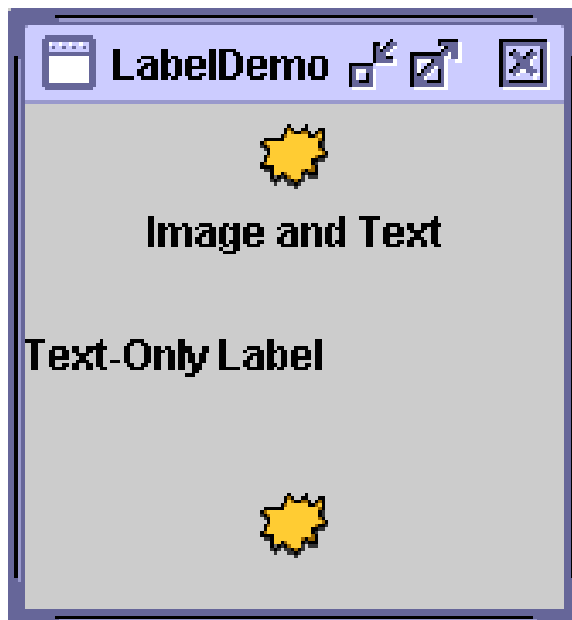


The image displays several Swing GUI components:

- Buttons:** A panel containing four icons (a pencil, a paper, a pencil with eraser, and a ruler), a checked checkbox labeled "Check 1", a radio button labeled "Radio 2", and an "OK" button.
- Combo box:** A dropdown menu with "Pig" selected in the header. The list below includes "Bird", "Cat" (highlighted by a mouse cursor), "Dog", "Rabbit", and "Pig".
- List:** A list box containing the months "January", "February", "March" (highlighted), and "April".
- Menu:** A menu bar with "A Menu" and "Another Menu". The "A Menu" dropdown is open, showing items: "A text-only menu item" (with "Alt-1" shortcut), "Both text and icon" (with a star icon), "A radio button menu item" (with a radio button), "A check box menu item" (with a checkbox), and "A submenu" (with a right-pointing arrow).
- Slider:** A slider labeled "Frames Per Second" with a range from 0 to 30. The slider knob is positioned at approximately 15.
- Spinner:** A spinner box showing the number "20".
- Text field or Formatted text field:** A text field labeled "Years:" containing the number "30".

BASIC GUI : SWING COMPONENTS

Uneditable Information Displays



Label



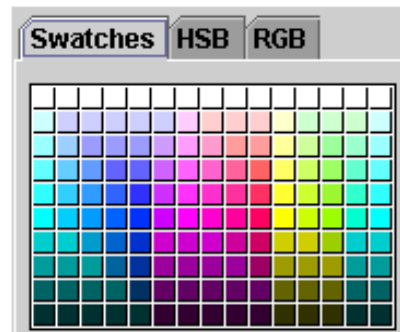
Progress bar



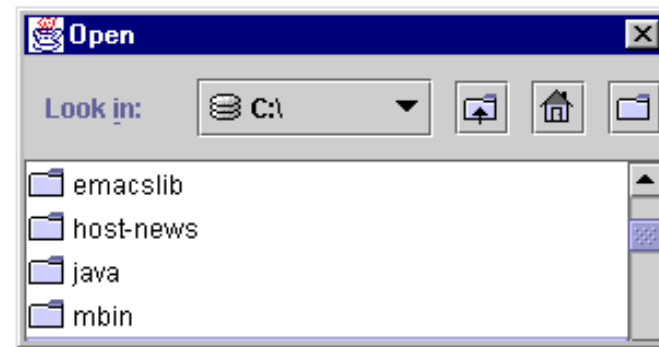
Tool tip

BASIC GUI : SWING COMPONENTS

Interactive Displays of Highly Formatted Information



Color chooser



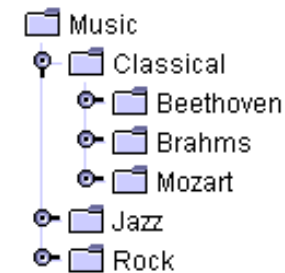
File chooser

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

Table

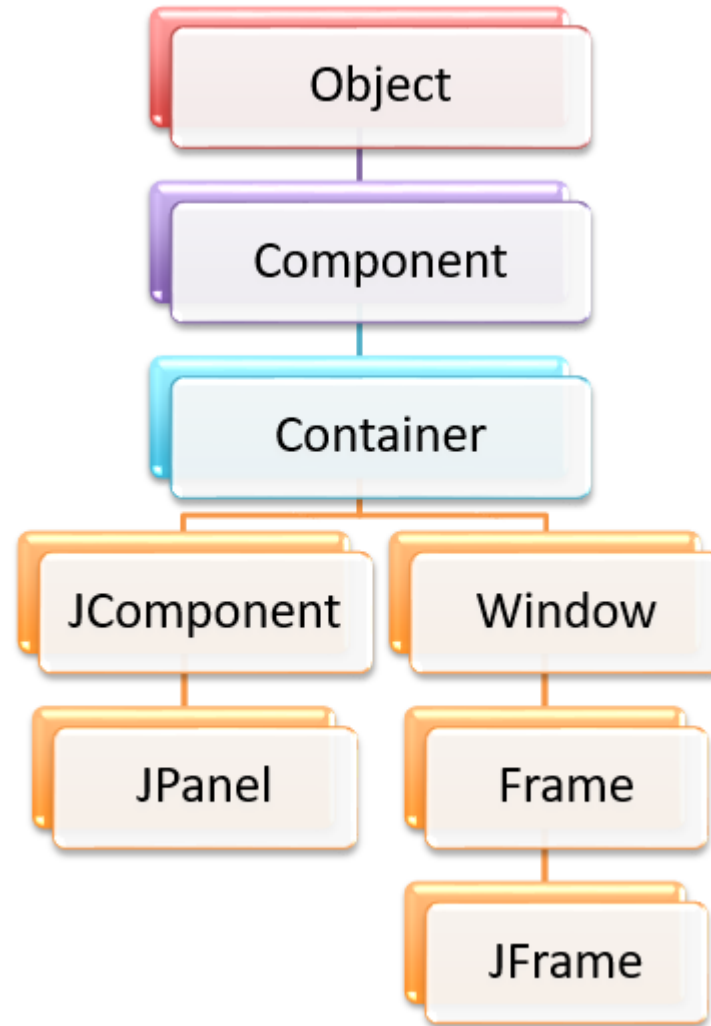


Text



Tree

BASIC GUI : SWING COMPONENTS



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