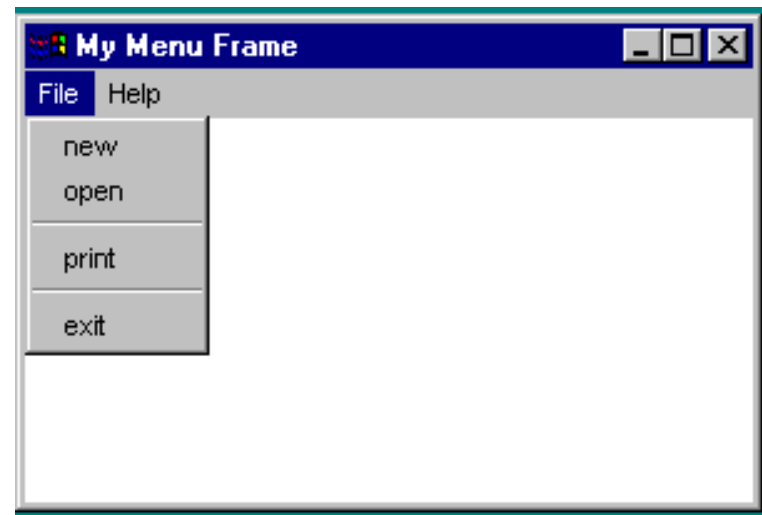


21 Menus, Toolbars, and Dialogs

Chapter 34@8e

Menus

- Java provides several classes—JMenuBar, JMenu, JMenuItem, JCheckBoxMenuItem, and JRadioButtonMenuItem—to implement menus in a frame.
- A JFrame or JApplet can hold a *menu bar* to which the *pull-down menus* are attached. Menus consist of *menu items* that the user can select (or toggle on or off). Menu bars can be viewed as a structure to support menus.



The JMenuBar Class

A menu bar holds menus; the menu bar can only be added to a frame. Following is the code to create and add a JMenuBar to a frame:

```
JFrame f = new JFrame();  
f.setSize(300, 200);  
f.setVisible(true);  
JMenuBar mb = new JMenuBar();  
f.setJMenuBar(mb);
```



The JMenu Class

You attach menus onto a `JMenuBar`. The following code creates two menus, File and Help, and adds them to the `JMenuBar mb`:

```
JMenu fileMenu = new JMenu("File", false);
JMenu helpMenu = new JMenu("Help", true);
mb.add(fileMenu);
mb.add(helpMenu);
```

```
/**
 * Constructs a new JMenu with the supplied string as
 * its text and specified as a tear-off menu or not.
 *
 * @param s the text for the menu label
 * @param b can the menu be torn off (not yet implemented)
 */
public JMenu(String s, boolean b) {
    this(s);
}
```

如果布尔值为false，那么当释放鼠标按钮后，菜单项会消失；如果布尔值为true，那么当释放鼠标按钮后，菜单项仍将显示。这时的菜单称为 `tearOff` 菜单。

The JMenuItem Class

You add menu items on a menu. The following code adds menu items and item separators in menu fileMenu:

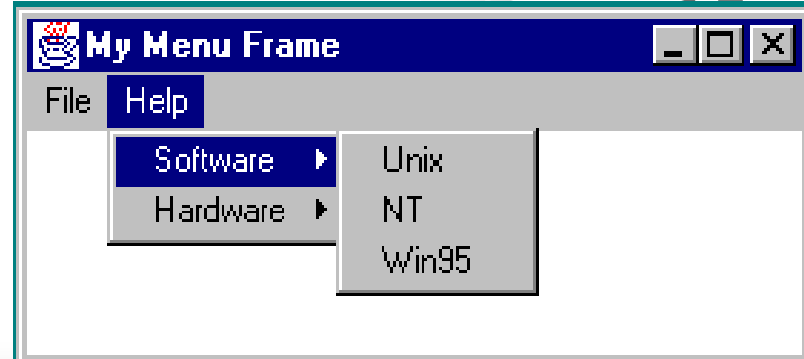
```
fileMenu.add(new JMenuItem("new"));  
fileMenu.add(new JMenuItem("open"));  
fileMenu.addSeparator();  
fileMenu.add(new JMenuItem("print"));  
fileMenu.add(new JMenuItem("exit"));  
fileMenu.addSeparator();
```



Submenus

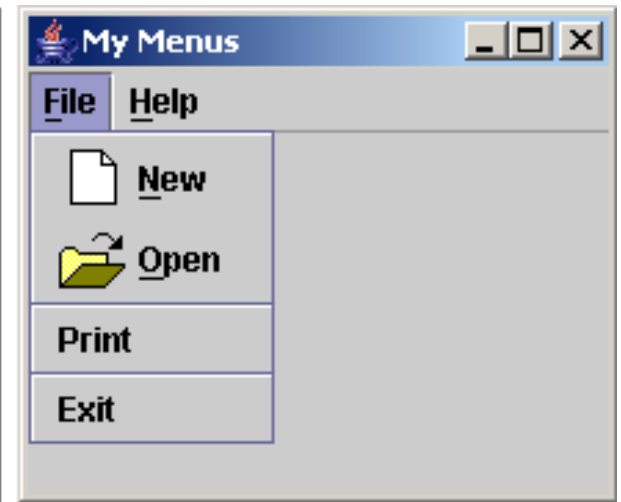
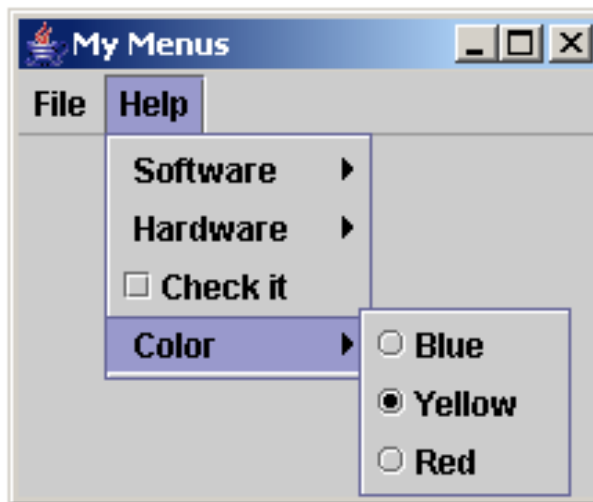
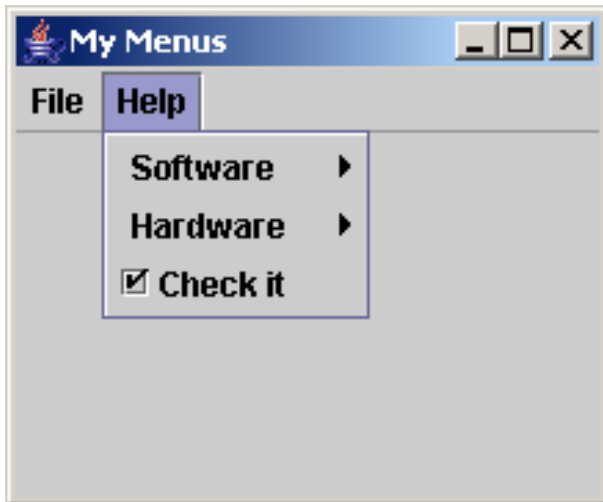
You can add submenus into menu items. The following code adds the submenus “Unix,” “NT,” and “Win95” into the menu item “Software.”

```
JMenu softwareHelpSubMenu = new JMenu("Software");  
JMenu hardwareHelpSubMenu = new JMenu("Hardware");  
helpMenu.add(softwareHelpSubMenu);  
helpMenu.add(hardwareHelpSubMenu);  
softwareHelpSubMenu.add(new JMenuItem("Unix"));  
softwareHelpSubMenu.add(new JMenuItem("NT"));  
softwareHelpSubMenu.add(new JMenuItem("Win95"));
```



Check Box Menu Items

```
helpMenu.add(new JCheckBoxMenuItem("Check it"));
```



Radio Button Menu Items

```
JMenu colorHelpSubMenu = new JMenu("Color");  
helpMenu.add(colorHelpSubMenu);
```

```
JRadioButtonMenuItem jrbmiBlue, jrbmiYellow, jrbmiRed;  
colorHelpSubMenu.add(jrbmiBlue = new JRadioButtonMenuItem("Blue"));  
colorHelpSubMenu.add(jrbmiYellow = new JRadioButtonMenuItem("Yellow"));  
colorHelpSubMenu.add(jrbmiRed = new JRadioButtonMenuItem("Red"));
```

```
ButtonGroup btg = new ButtonGroup();  
btg.add(jrbmiBlue);  
btg.add(jrbmiYellow);  
btg.add(jrbmiRed);
```



Image Icons, Keyboard Mnemonics, and Keyboard Accelerators

```
JMenuItem jmiNew, jmiOpen;
```

```
fileMenu.add(jmiNew = new JMenuItem("New"));
```

```
fileMenu.add(jmiOpen = new JMenuItem("Open"));
```

```
jmiNew.setIcon(new ImageIcon("image/new.gif"));
```

```
jmiOpen.setIcon(new ImageIcon("image/open.gif"));
```

```
helpMenu.setMnemonic('H');
```

```
fileMenu.setMnemonic('F');
```

```
jmiNew.setMnemonic('N');
```

```
jmiOpen.setMnemonic('O');
```

```
jmiOpen.setAccelerator(KeyStroke.getKeyStroke(KeyEvent.VK_O, ActionEvent.CTRL_MASK));
```



setMnemonic 设置的是括号里的。只有在菜单显示的情况下才可以起作用。

setAccelerator 设置的是后面的 Ctrl + O 之类。

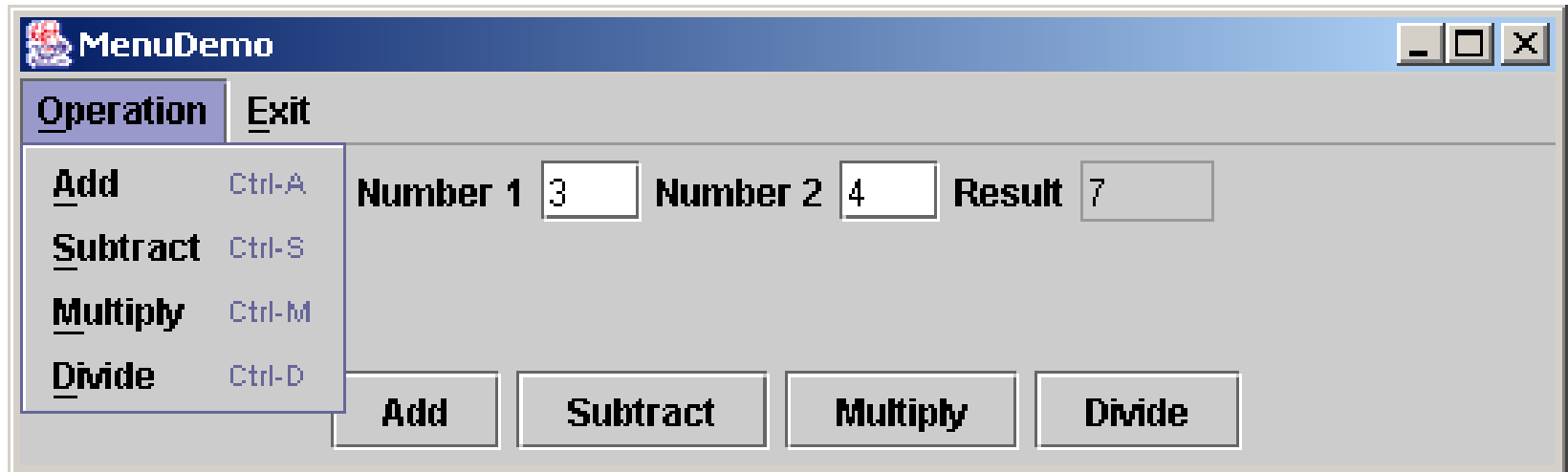
Example: Using Menus

- ➡ Objective: Create a user interface that performs arithmetic. The interface contains labels and text fields for Number 1, Number 2, and Result. The Result box displays the result of the arithmetic operation between Number 1 and Number 2.



Example: Using Menus

Problem: Create a user interface that performs arithmetic. The interface contains labels and text fields for Number 1, Number 2, and Result. The Result box displays the result of the arithmetic operation between Number 1 and Number 2.



MenuDemo

Run

Popup Menus

A popup menu, also known as a context menu, is **like a regular menu, but does not have a menu bar and can float anywhere on the screen.**

Creating a popup menu is similar to creating a regular menu. First, you create an instance of **JPopupMenu**, then you can add JMenuItem, JCheckBoxMenuItem, JRadioButtonMenuItem, and separators to the popup menu. For example, the following code creates a JPopupMenu and adds JMenuItem items into it:

```
JPopupMenu jPopupMenu = new JPopupMenu();  
jPopupMenu.add(new JMenuItem("New"));  
jPopupMenu.add(new JMenuItem("Open"));
```



Displaying a Popup Menu

A regular menu is always attached to a menu bar using the setJMenuBar method, but a popup menu is associated with a parent component and is displayed using the show method in the JPopupMenu class. You specify the parent component and the location of the popup menu, using the coordinate system of the parent like this:

```
JPopupMenu.show(component, x, y);
```



Popup Trigger

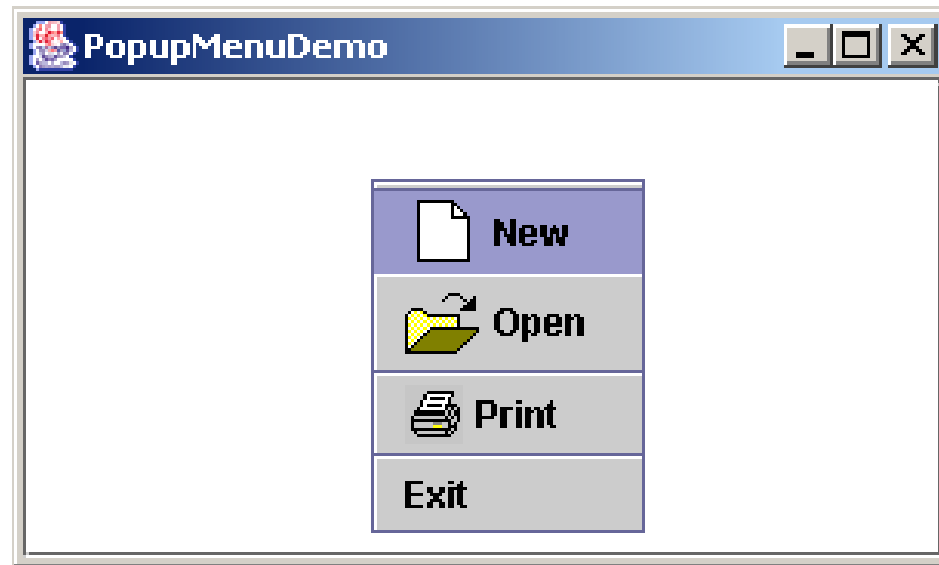
The popup menu usually contains the commands for an object. Customarily, you display a popup menu by pointing to the object and clicking a certain mouse button, the so-called *popup trigger*.

Popup triggers are system-dependent. In Windows, the popup menu is displayed when the right mouse button is released. In Motif, the popup menu is displayed when the third mouse button is pressed and held down.



Example: Using Popup Menus

Problem: The program creates a text area in a scroll pane. The popup menu is displayed when the mouse pointed to the text area triggers the popup menu.



PopupMenuDemo

Run

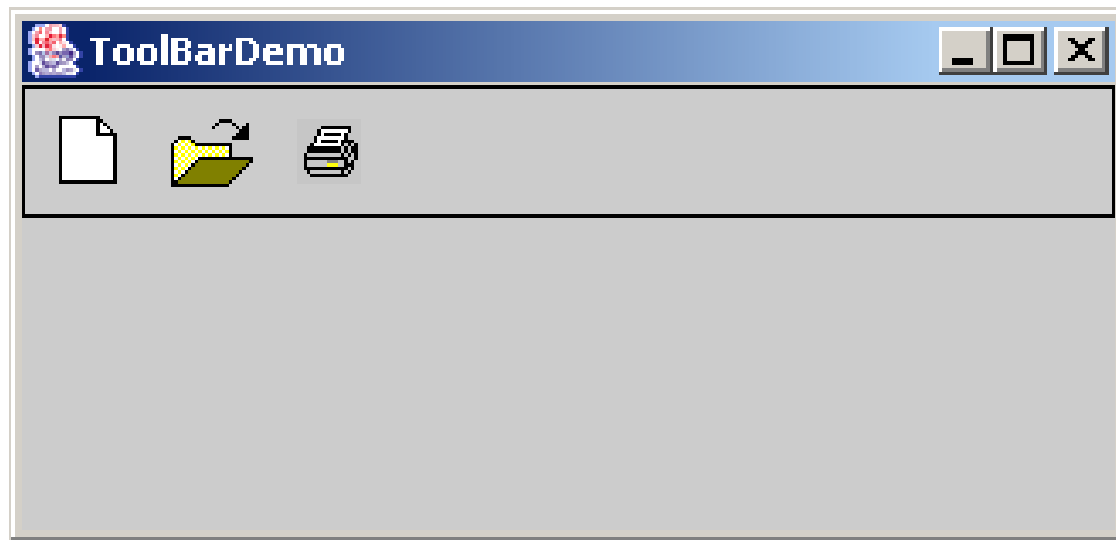
JToolBar

In user interfaces, a toolbar is often used to hold commands that also appear in the menus. Frequently used commands are placed in a toolbar for quick access. Clicking a command in the toolbar is faster than choosing it from the menu.

Swing provides the JToolBar class as the container to hold toolbar components. JToolBar uses BoxLayout to manage components by default. You can set a different layout manager if desired. The components usually appear as icons. Since icons are not components, they cannot be placed into a toolbar directly. Instead you may place buttons into the toolbar and set the icons on the buttons. An instance of JToolBar is like a regular container. Often it is placed in the north, west, or east of a container of BorderLayout.

Example: Using Tool Bars

Problem: Create a JToolBar that contains three buttons with the icons representing the commands New, Open, and Print icons.

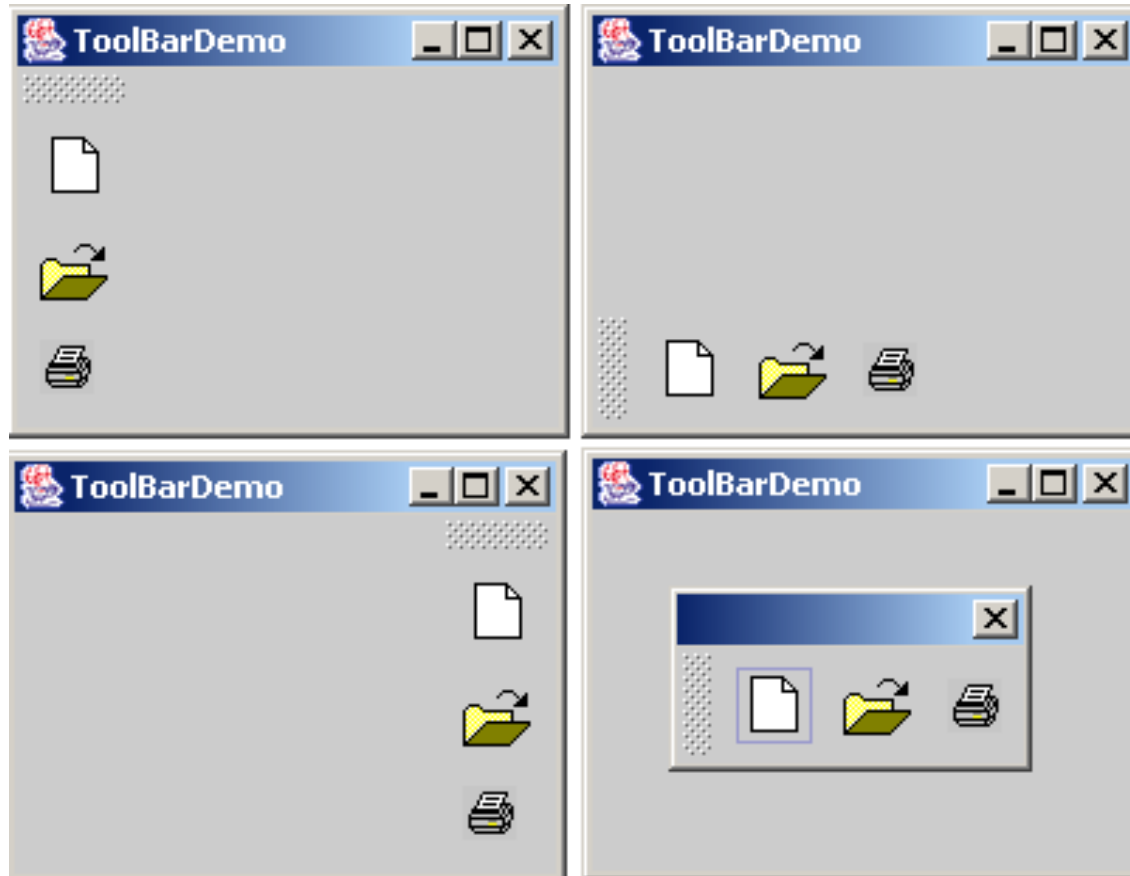


ToolBarDemo

Run

Floatable Tool Bars

JToolBar may be floatable.

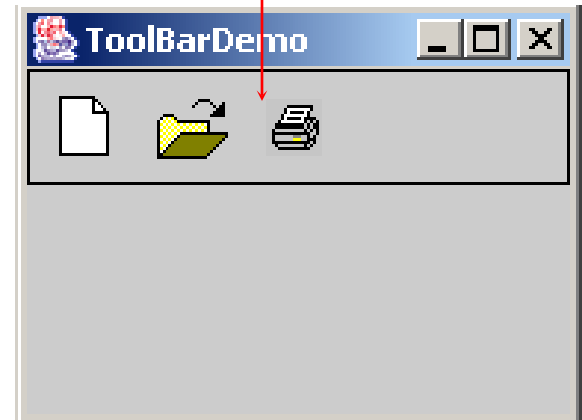
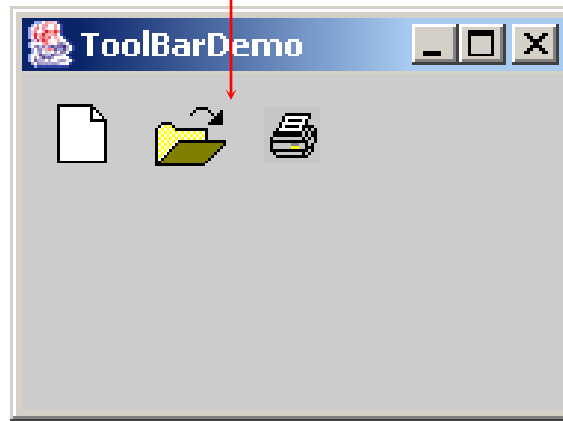
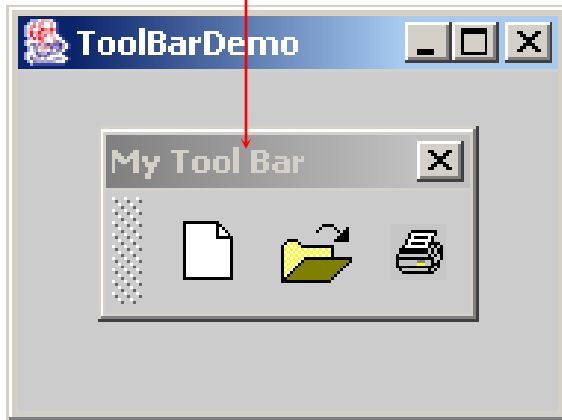


Tool Bars Title and Border

You can set a title for the floatable tool bar.

If you set floatable false, the floatable controller is not displayed

If you set floatable false, the floatable controller is not displayed



Processing Actions Using the Action Interface

Often menus and tool bars contain some **common** actions. For example, you can save a file by choosing *File, Save*, or by clicking the save button in the tool bar.

Swing provides the Action interface, which can be used to create **action objects** for processing actions. Using Action objects, common action processing can be centralized and separated from the other application code.



ActionListener, Action, and AbstractAction

The Action interface provides a useful extension to the ActionListener interface in cases where the same functionality may be accessed by several controls

java.awt.event.ActionListener



javax.swing.Action

+*getValue(key: String): Object*
+*isEnabled(): boolean*
+*putValue(key: String, value: Object): void*
+*setEnabled(b: boolean): void*

Gets one of this object's properties using the associated key.
Returns true if action is enabled.
Associates a key/value pair with the action.
Enables or disables the action.

javax.swing.Action



javax.swing.AbstractAction

+*AbstractAction()*
+*AbstractAction(name: String)*
+*AbstractAction(name: String, icon: Icon)*
+*getKeys(): Object[]*

Defines an Action object with a default description string and default icon.
Defines an Action object with the specified description string and a default icon.
Defines an Action object with the specified description string and the specified icon.
Returns an array of objects which are keys for which values have been set for this AbstractAction, or null if no keys have values set.

AbstractAction class provides a default implementation for Action



Creating and Using an Action instance

```
Action exitAction = new AbstractAction("Exit") {  
    public void actionPerformed(ActionEvent e) {  
        System.exit(0);  
    }  
};
```

Certain containers, such as JMenu and JToolBar, know how to add an Action object. **When an Action object is added to such a container, the container automatically creates an appropriate component for the Action object, and registers a listener with the Action object.** Here is an example of adding an Action object to a menu and a tool bar:

```
jMenu.add(exitAction);  
jToolBar.add(exitAction);
```



Associating Action instances with Buttons

Several Swing components such as JButton, JRadioButton, and JCheckBox contain constructors to create instances from Action objects. For example, you can create a JButton from an Action object, as follows:

```
JButton jbt = new JButton(exitAction);
```



Associating Action instances with Keystrokes

Action objects can also be used to respond to keystrokes. To associate actions with keystrokes, you need to create an instance of the `KeyStroke` class using the static `getKeyStroke` method, as follows:

```
KeyStroke exitKey =  
    KeyStroke.getKeyStroke(KeyEvent.VK_E, KeyEvent.CTRL_MASK);
```

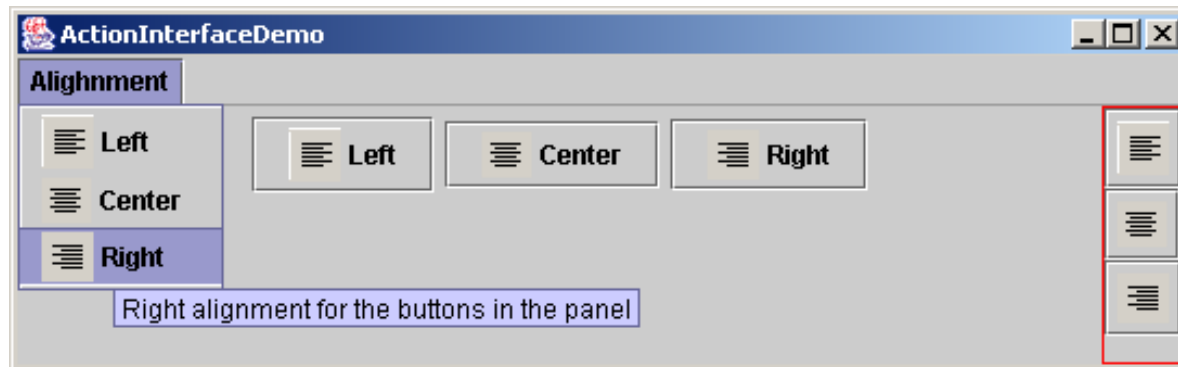
You can now associate an action with the keystroke by registering it with an instance of `JComponent`. For example, the following code associates `exitAction` with `exitKey`, and registers this action with `jPanel1`.

```
jPanel1.registerKeyboardAction  
    (exitAction, exitKey, Component.WHEN_IN_FOCUSED_WINDOW);
```



Example: Using Actions

Problem: Write a program that creates three menu items, Left, Center, and Right, three tool bar buttons, Left, Center, and Right, and three regular buttons, Left, Center, and Right in a panel. The panel that holds the buttons uses the FlowLayout. The action of the left, center, and right button sets the alignment of the FlowLayout to left, right, and center, respectively.

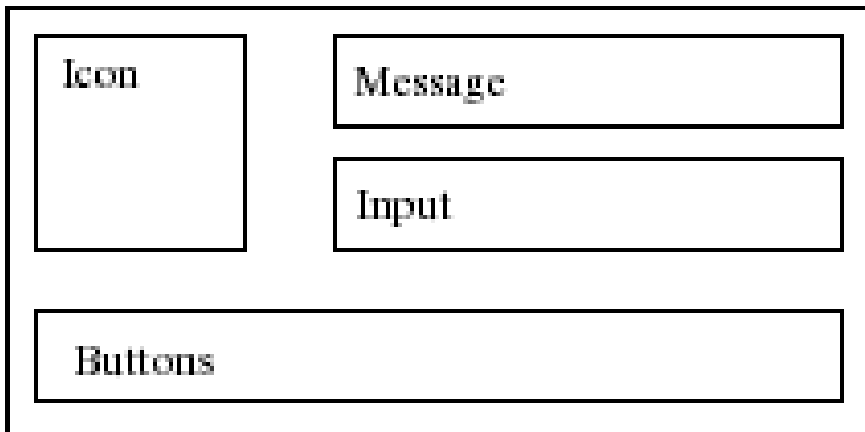


ActionInterfaceDemo

Run

JOptionPane Dialogs

A *dialog* is normally used as a **temporary window** to receive additional information from the user, or to provide notification that some event has occurred. Java provides the `JOptionPane` class, which can be used to create standard dialogs. You can also build custom dialogs by extending the `JDialog` class.



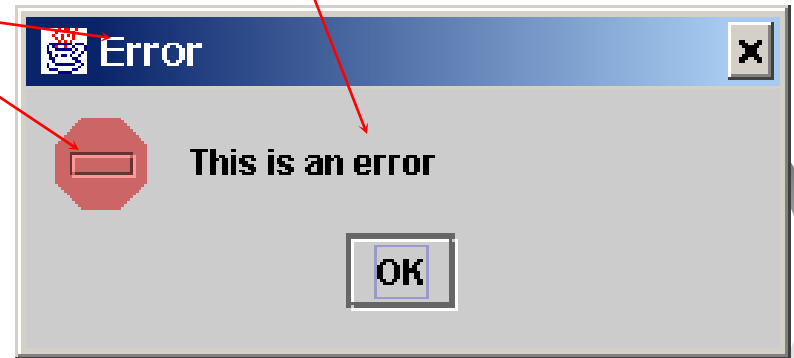
A `JOptionPane` dialog can display an icon, a message, an input, and option buttons.



Message Dialogs

A message dialog box simply displays a message to alert the user and waits for the user to click the OK button to close the dialog.

```
JOptionPane.showMessageDialog(null, "This is an error",  
"Error", JOptionPane.ERROR_MESSAGE);
```



Message Types

The messageType is one of the following constants:

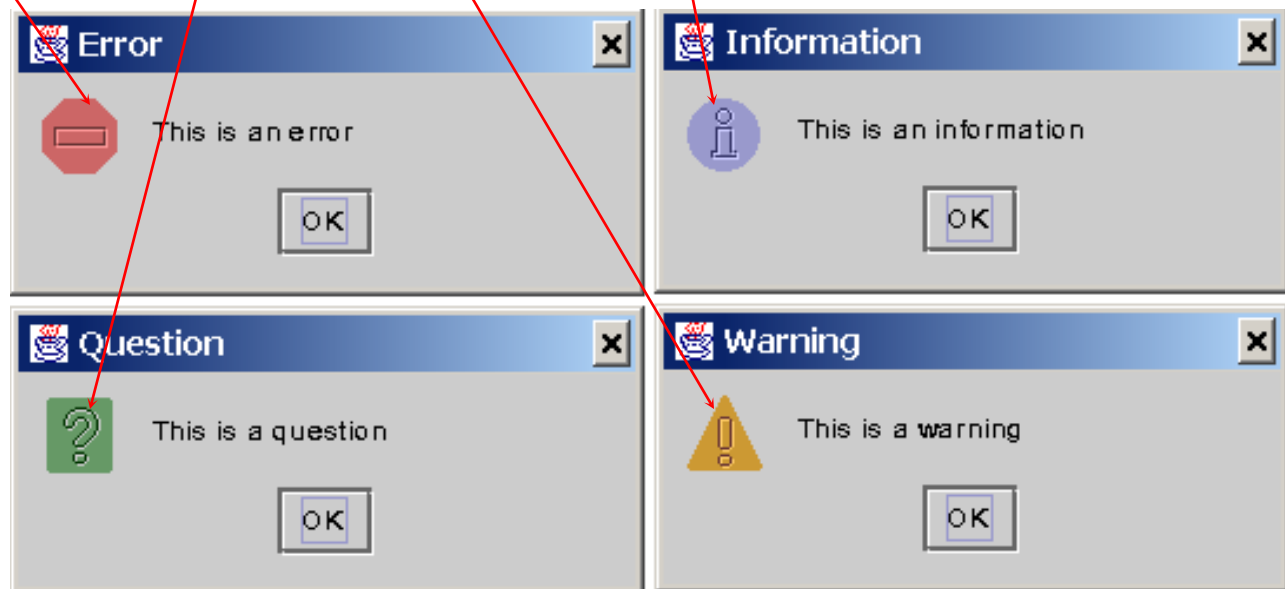
JOptionPane.ERROR_MESSAGE

JOptionPane.INFORMATION_MESSAGE

JOptionPane.PLAIN_MESSAGE

JOptionPane.WARNING_MESSAGE

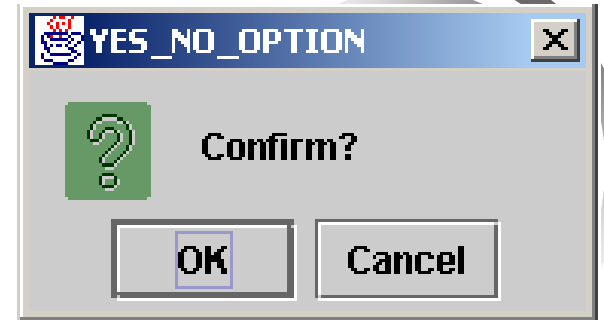
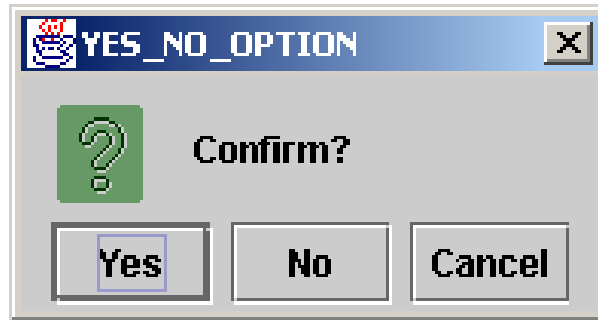
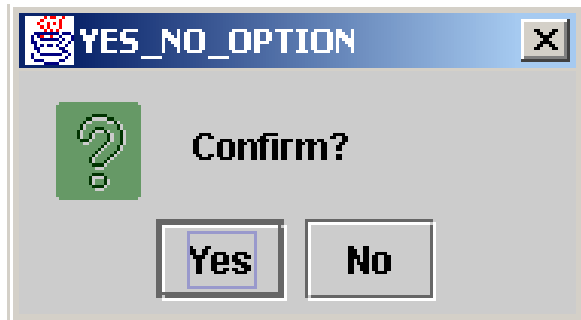
JOptionPane.QUESTION_MESSAGE



Confirmation Dialogs

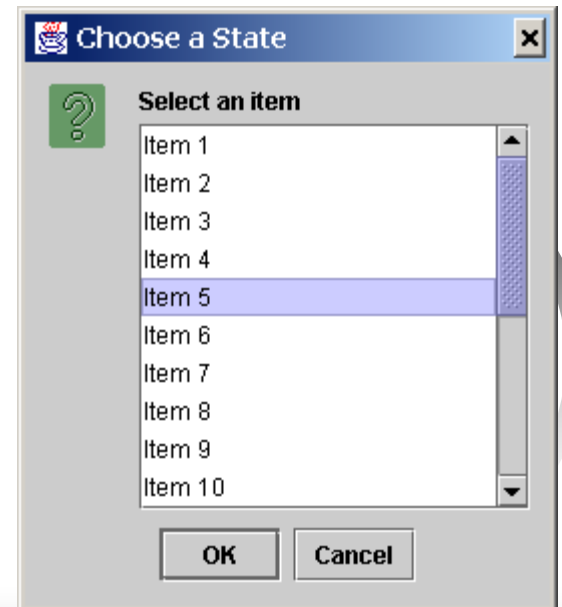
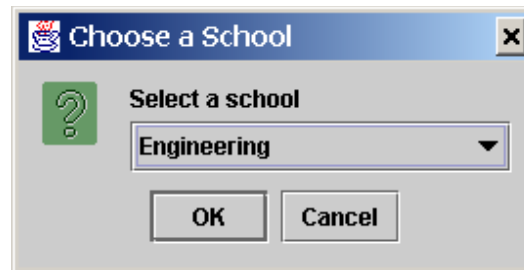
A message dialog box displays a message and waits for the user to click the OK button to dismiss the dialog.

The message dialog does not return any value. A confirmation dialog asks a question and requires the user to respond with an appropriate button. **The confirmation dialog returns a value that corresponds to a selected button.**



Input Dialogs

An *input dialog* box is used to receive input from the user. The input can be entered from a text field or selected from a combo box or a list. Selectable values can be specified in an array, and a particular value can be designated as the initial selected value.



Option Dialogs

An *option dialog* allows you to create custom buttons.

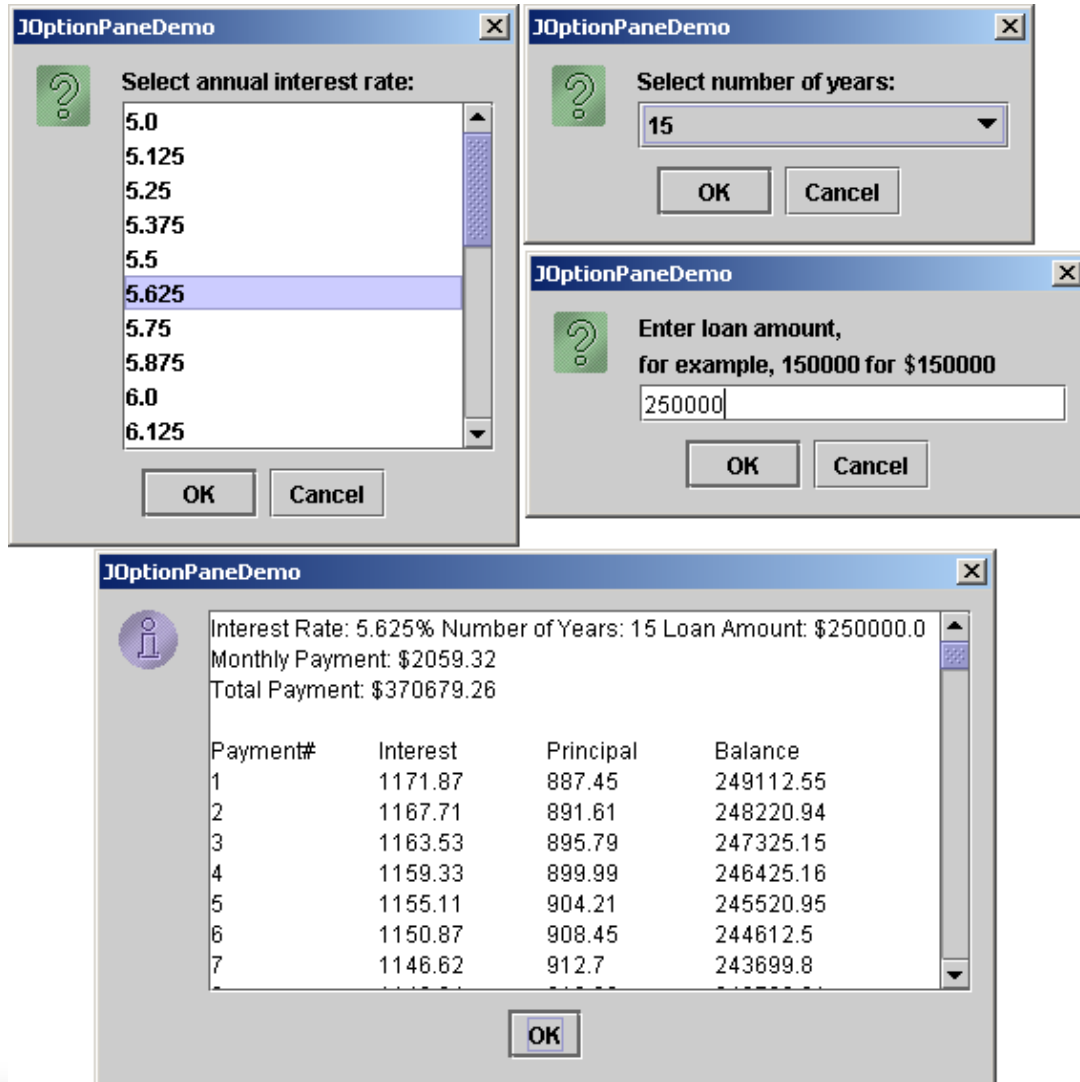


Example: Creating JOptionPane Dialogs

Problem: This example demonstrates using standard dialogs. The program prompts the user to select the annual interest rate from a list in an input dialog, the number of years from a combo box in an input dialog, and the loan amount from an input dialog, and displays the loan payment schedule in a text area inside a JScrollPane in a message dialog.



Example: Creating JOptionPane Dialogs, cont.



JOptionPaneDemo

Run

Creating Custom Dialogs

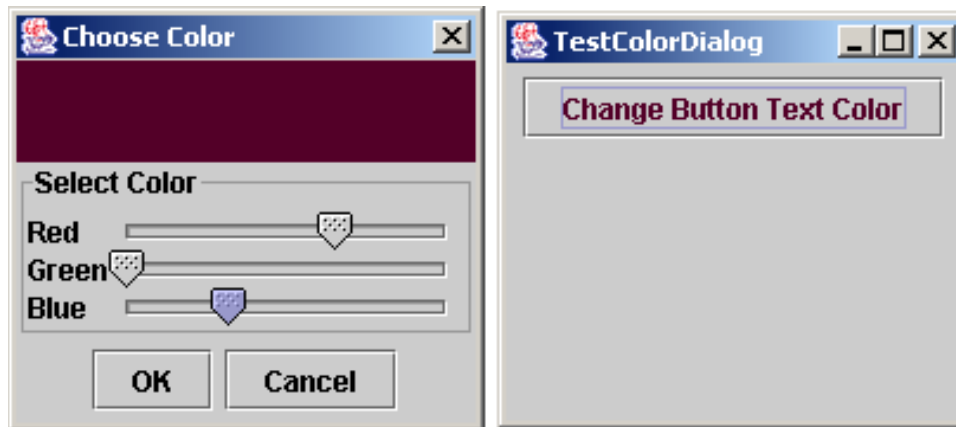
In Swing, the JDialog class can be extended to create custom dialogs.

JDialog is a subclass of java.awt.Dialog fitted with an instance of JRootPane. As with JFrame, components are added to the contentPane of JDialog. Creating a custom dialog usually involves laying out user interface components in the dialog, adding buttons for dismissing the dialog, and installing listeners that respond to button actions.



Example: Creating Custom Dialogs

Problem: Create a custom dialog box for choosing colors, as shown in Figure 34.18 (a). Use this dialog to choose the color for the foreground for the button, as shown in Figure 34.18 (b).



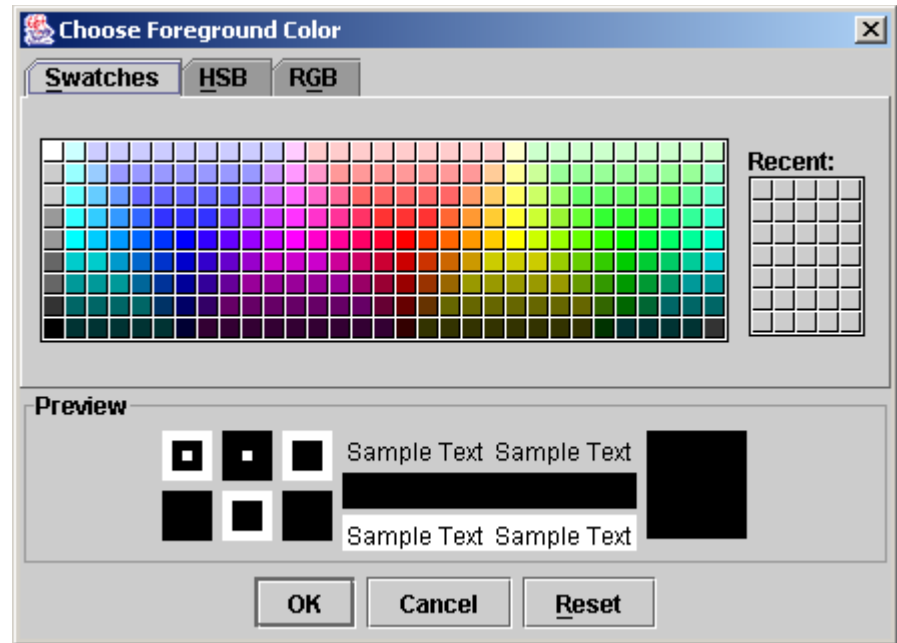
ColorDialog

TestColorDialog

Run

JColorChooser

Color dialogs are commonly used in GUI programming. Swing provides a convenient and versatile color dialog named javax.swing.JColorChooser. Like JOptionPane, JColorChooser is a lightweight component inherited from JComponent. It can be added to any container.

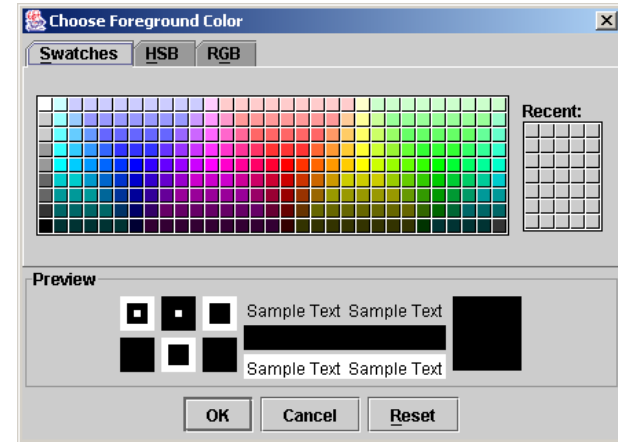


Using JColorChooser

To create a JColorChooser, use
`new JColorChooser();`

To display a JColorChooser dialog box, use

```
public static Color showDialog(Component parentComponent,  
    String title, Color initialColor)
```



This method creates an instance of JDialog with three buttons, *OK*, *Cancel*, and *Reset*, to hold a JColorChooser object, as shown in Figure 34.27. The method displays a modal dialog. If the user clicks the *OK* button, the method dismisses the dialog and returns the selected color. If the user clicks the *Cancel* button or closes the dialog, the method dismisses the dialog and returns null.

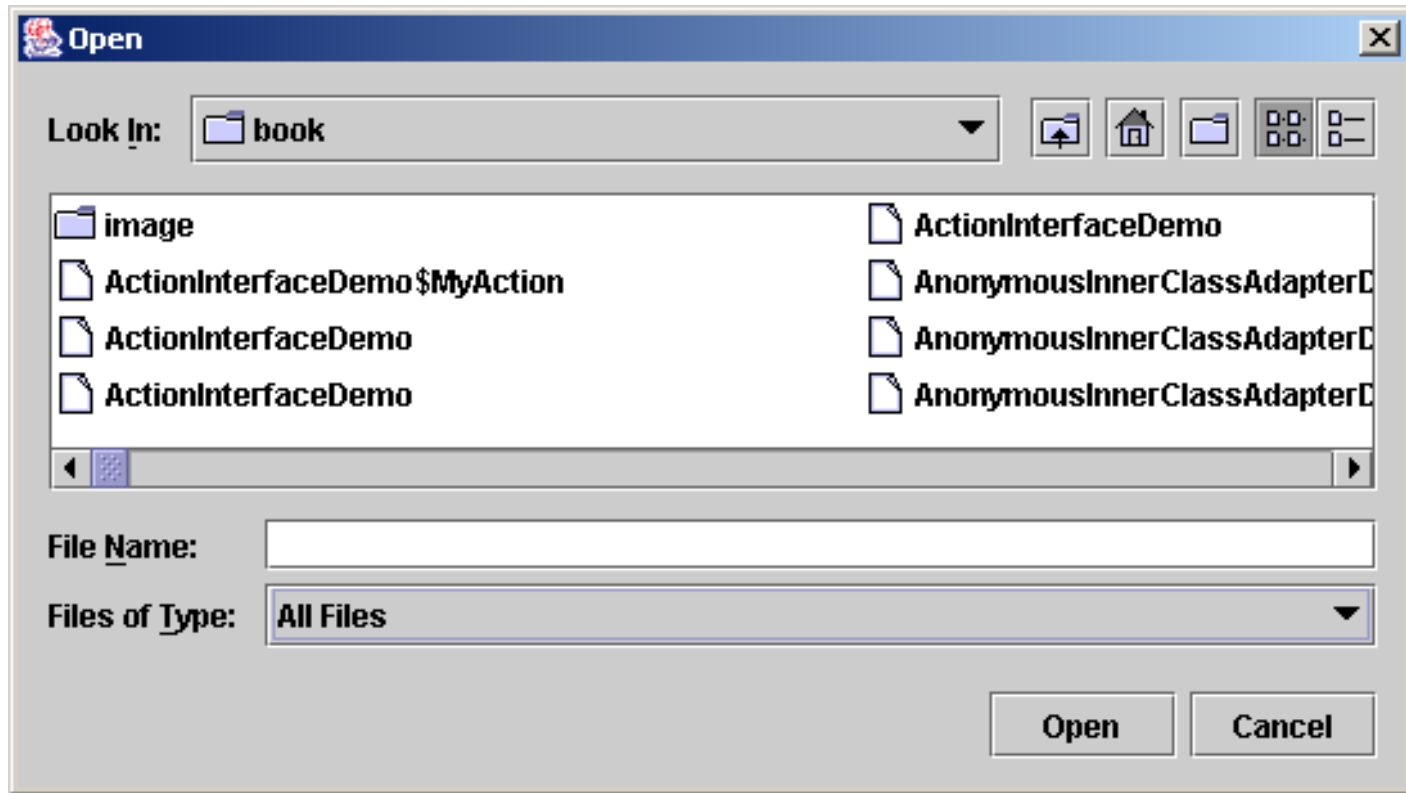
```
public class JColorChooserDemo extends javax.swing.JApplet {
    public void init() {
        Color color = JColorChooser.showDialog(this, "Choose a color",
            Color.YELLOW);
    }

    public static void main(String[] args) {
        JColorChooserDemo applet = new JColorChooserDemo();
        JFrame frame = new JFrame();
        //EXIT_ON_CLOSE == 3
        frame.setDefaultCloseOperation(3);
        frame.setTitle("TestColorDialog");
        frame.getContentPane().add(applet, BorderLayout.CENTER);
        applet.init();
        applet.start();
        frame.setSize(400,320);
        Dimension d = Toolkit.getDefaultToolkit().getScreenSize();
        frame.setLocation((d.width - frame.getSize().width) / 2,
            (d.height - frame.getSize().height) / 2);
        frame.setVisible(true);
    }
}
```



JFileChooser

Swing provides the `javax.swing.JFileChooser` class that displays a dialog box from which the user can navigate through the file system and select files for loading or saving.



Using JFileChooser

Creating a JFileChooser: Using JFileChooser's no-arg constructor.

Displaying an Open File Dialog:

The file dialog box can appear in two types: open and save. The open type is for opening a file, and the save type is for storing a file. To create an open file dialog, use the following method:

```
public int showOpenDialog(Component parent)
```

This method creates a dialog box that contains an instance of JFileChooser for opening a file. The method returns an int value, either APPROVE_OPTION or CANCEL_OPTION, which indicates whether the OK button or the Cancel button was clicked.

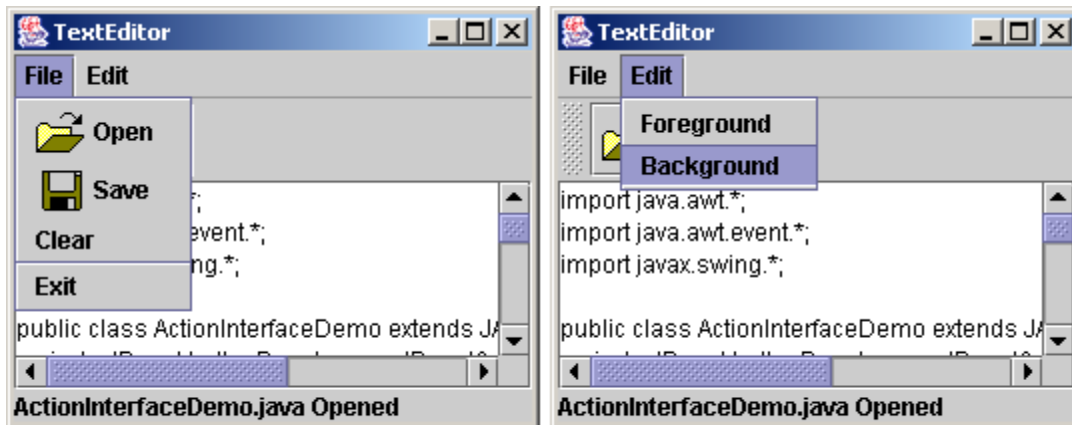
Displaying a Save File Dialog:

```
public int showSaveDialog(Component parent)
```



Example: Creating a Text Editor

Problem: This example uses Swing menus, tool bar, file chooser, and color chooser to create a simple text editor, as shown in Figure 34.23, which allows the user to open and save text files, clear text, and change the color and font of the text.



TextEditor

Run

Creating Internal Frames

The JInternalFrame class is almost the same as the external JFrame class. The components are added to the internal frame in the same way as they are added to the external frame. The internal frame can have menus, the title, the Close icon, the Minimize icon, and the Maximize icon just like the external frame.



Example: Creating Internal Frames

Problem: This example creates internal frames to display flags in an applet. You can select flags from the Flags menu. Clicking a menu item causes a flag to be displayed in an internal frame.



ShowInternalFrame

Run