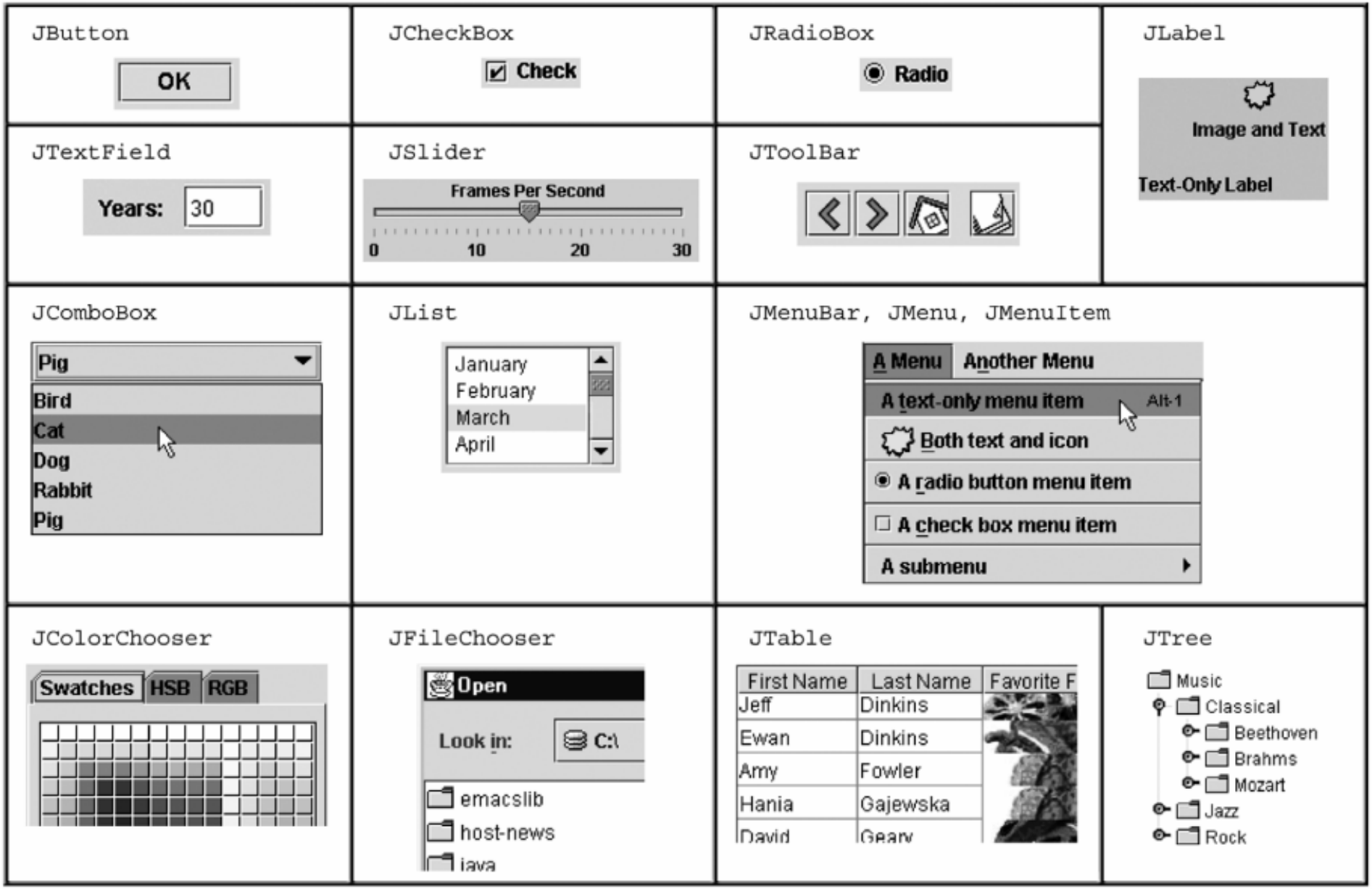
CSE 331

Visual Index of Swing GUI Components

slides created by Marty Stepp
based on materials by M. Ernst, S. Reges, D. Notkin, R. Mercer, Wikipedia
http://www.cs.washington.edu/331/

Components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Swing inheritance hierarchy

- Component (AWT)
  - Window
    - Frame
      - **JFrame** (Swing)
      - **JDialog**
  - Container
    - JComponent (Swing)
      - **JButton**
      - **JComboBox**
      - **JMenuBar**
      - **JPopupMenu**
      - **JScrollPane**
      - **JSplitPane**
      - **JToolbar**
      - **JTextField**
      - **JColorChooser**
      - **JLabel**
      - **JOptionPane**
      - **JProgressBar**
      - **JSlider**
      - **JTabbedPane**
      - **JTree**
      - ...
      - **JFileChooser**
      - **JList**
      - **JPanel**
      - **JScrollbar**
      - **JSpinner**
      - **JTable**
      - **JTextArea**

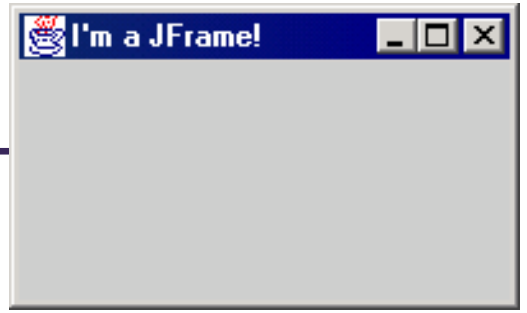
```
import java.awt.*;
import javax.swing.*;
```

Component properties

- Each has a `get` (or `is`) accessor and a `set` modifier method.
- examples: `getColor`, `setFont`, `setEnabled`, `isVisible`

name	type	description
background	`Color`	background color behind component
border	`Border`	border line around component
enabled	`boolean`	whether it can be interacted with
focusable	`boolean`	whether key text can be typed on it
font	`Font`	font used for text in component
foreground	`Color`	foreground color of component
height, width	`int`	component's current size in pixels
visible	`boolean`	whether component can be seen
tooltip text	`String`	text shown when hovering mouse
size, minimum / maximum / preferred size	`Dimension`	various sizes, size limits, or desired sizes that the component may take

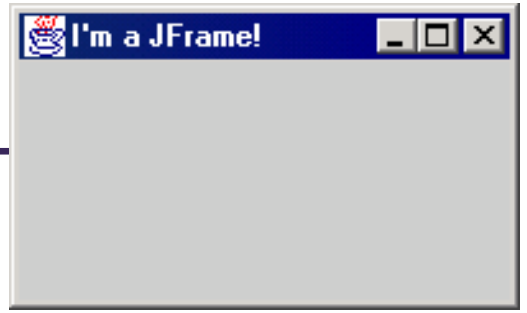
JFrame



a graphical window to hold other components

- `public JFrame()`
  `public JFrame(String title)`
  Creates a frame with an optional title.
  - Call `setVisible(true)` to make a frame appear on the screen after creating it.
- `public void add(Component comp)`
  Places the given component or container inside the frame.

More JFrame



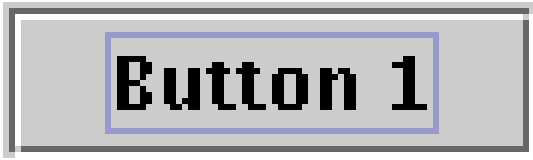
- `public void setDefaultCloseOperation(int op)`
  Makes the frame perform the given action when it closes.
  - Common value passed: `JFrame.EXIT_ON_CLOSE`
  - If not set, the program will never exit even if the frame is closed.

- `public void setSize(int width, int height)`
  Gives the frame a fixed size in pixels.

- `public void pack()`
  Resizes the frame to fit the components inside it snugly.

JButton

a clickable region for causing actions to occur



- `public JButton(String text)`
  Creates a new button with the given string as its text.

- `public String getText()`
  Returns the text showing on the button.

- `public void setText(String text)`
  Sets button's text to be the given string.

JLabel

a string of text displayed on screen in a graphical program. Labels often give information or describe other components

- `public JLabel(String text)`
  Creates a new label with the given string as its text.

- `public String getText()`
  Returns the text showing on the label.

- `public void setText(String text)`
  Sets label's text to be the given string.

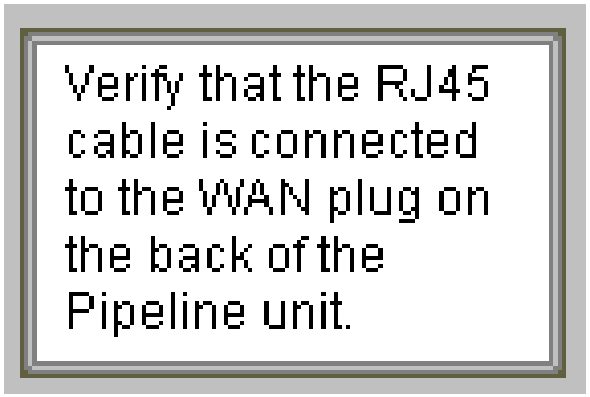
JTextField, JTextArea

an input control for typing text values
(field = single line; area = multi-line)

- `public JTextField(int columns)`
  `public JTextArea(int lines, int columns)`
  Creates a new field, the given number of letters wide.

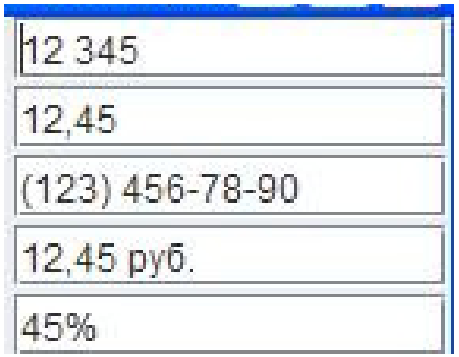
- `public String getText()`
  Returns the text currently in the field.

- `public void setText(String text)`
  Sets field's text to be the given string.



JFormattedTextField

a text box that allows special formatting
and can enforce constraints about allowable text



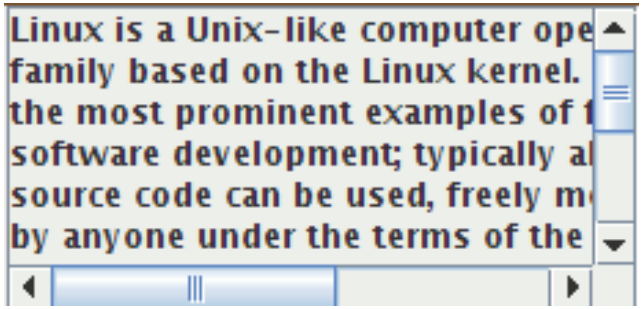
- `public JFormattedTextField(Format format)`
  Creates a new field that constrains itself to the given text format.
  (e.g. DateFormat, NumberFormat, CurrencyFormat, MaskFormat)

- `public Object getValue()`
  `public void getValue(Object value)`
  The value currently set in the field, which may lag behind the text.

- `public void setFocusLostBehavior(int b)`
  Sets what field should do if user stops editing and value is illegal.

JScrollPane

a container that adds scrollbars around any other component



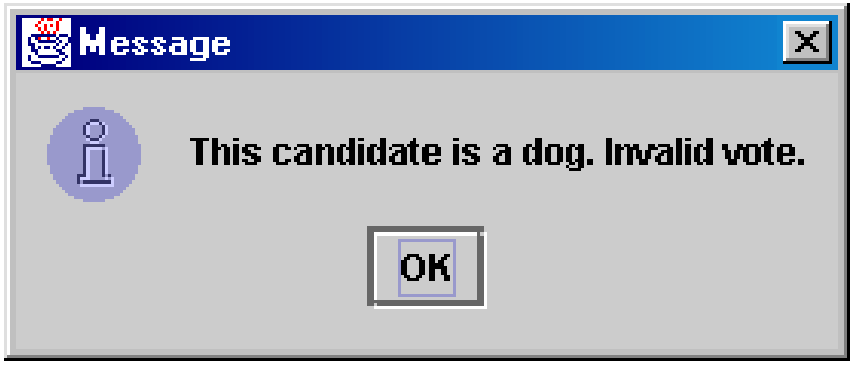
- `public JScrollPane(Component comp)`
  Wraps the given component with scrollbars.
  - After constructing the scroll pane, you must add the scroll pane, not the original component, to the onscreen container:

```
myContainer.add(new JScrollPane(textarea),
                BorderLayout.CENTER);
```

JOptionPane

- `JOptionPane.showMessageDialog(`**parent, message**`);`

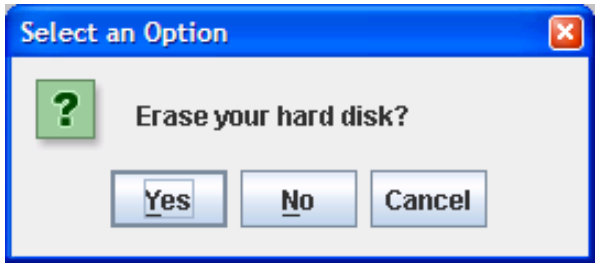
```
import javax.swing.*;

JOptionPane.showMessageDialog(null,
    "This candidate is a dog. Invalid vote.");
```



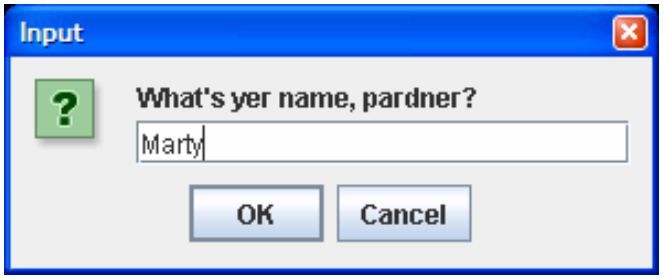
- Advantages:
  - Simple; looks better than console.
- Disadvantages:
  - Created with static methods; not object-oriented.
  - Not powerful (just simple dialog boxes).

More JOptionPane

- `JOptionPane.showConfirmDialog(`**parent, message**`)`
  - Displays a message and list of choices Yes, No, Cancel.
  - Returns an `int` such as `JOptionPane.YES_OPTION` or `NO_OPTION` to indicate what button was pressed.



- `JOptionPane.showInputDialog(`**parent, message**`)`
  - Displays a message and text field for input.
  - Returns the value typed as a String (or `null` if user presses Cancel).



JPanel

the default container class in Swing

- `public JPanel()`
  `public JPanel(LayoutManager mgr)`
  Constructs a panel with the given layout (default = flow layout).

- `public void add(Component comp)`
  `public void add(Component comp, Object info)`
  Adds a component to the container, possibly giving extra information about where to place it.

- `public void remove(Component comp)`

- `public void setLayout(LayoutManager mgr)`
  Uses the given layout manager to position components.

JCheckBox, JRadioButton

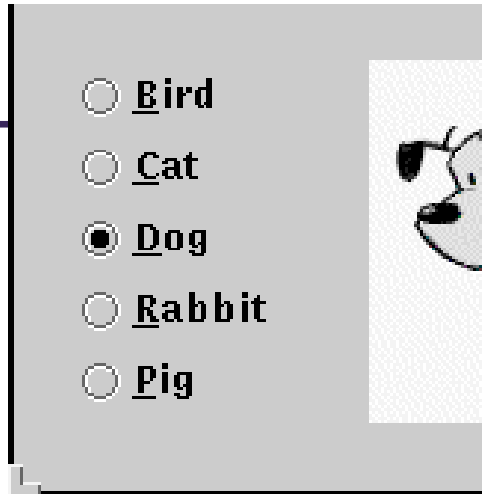
a toggleable yes/no value (checkbox)
or a way choose between options (radio)

- `public JCheckBox(String text)`
  `public JCheckBox(String text, boolean checked)`
  `public JRadioButton(String text)`
  Creates a checked/unchecked check box with given text.

- `public boolean isSelected()`
  Returns true if the check box is checked.

- `public void setSelected(boolean selected)`
  Sets box to be checked/unchecked.

ButtonGroup



a logical collection to ensure that exactly one radio button from a group is checked at a time

- `public ButtonGroup()`
- `public void add(JRadioButton button)`
  - The `ButtonGroup` is not a graphical component, just a logical group; the `RadioButton`s themselves also need to be added to an onscreen container to be seen.

Icon

a picture that can appear inside a component

- `public class ImageIcon implements Icon`
  - `public ImageIcon(String filename)`
  - `public ImageIcon(URL address)`

- in `JButton`, `JRadioButton`, `JCheckBox`, `JLabel`, etc…
  - constructor that takes an `Icon`
  - `public void setIcon(Icon)`
  - `public void setSelectedIcon(Icon)`
  - `public void setRolloverIcon(Icon)`

JComboBox

a drop-down list of selectable items

- `public JComboBox()`
- `public JComboBox(Vector items)`
- `public JComboBox(ComboBoxModel model)`
  Constructs a combo box. Can optionally pass a vector or model of items. (See `DefaultComboBoxModel` for a model implementation.)

- `public void addActionListener(ActionListener al)`
  Causes an action event to be sent to listener `al` when the user selects or types a new item in the combo box.

JComboBox methods

- `public void addItem(Object item)`
- `public Object getItemAt(int index)`
- `public void removeAllItems()`
- `public void removeItem(Object item)`
- `public void removeItemAt(int index)`

- `public int getSelectedIndex()`
- `public Object getSelectedItem()`
- `public void setSelectedItem(Object item)`
- `public void setSelectedIndex(int index)`
- `public void setEnabled(boolean enabled)`
- `public void setEditable(boolean editable)`

  If editable, the user can type new arbitrary values into the box.

JList

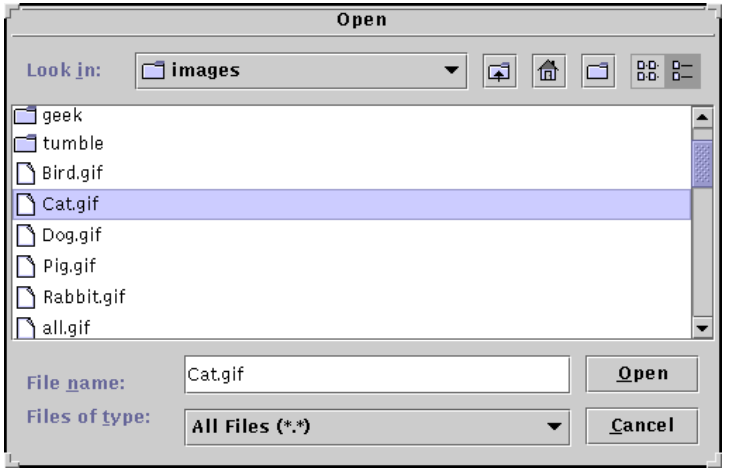
a list of selectable pre-defined text items

- `public JList()`
  Constructs an empty JList.
- `public JList(ListModel model)`
  `public JList(Object[] data)`
  `public JList(Vector data)`
  Constructs a JList that displays the given data.

- `public void addListSelectionListener(`
  `ListSelectionListener lsl)`
  Adds the given listener to be informed when the selected index changes for this list.

JFileChooser

a dialog box that allows the user to browse for a file to read/write



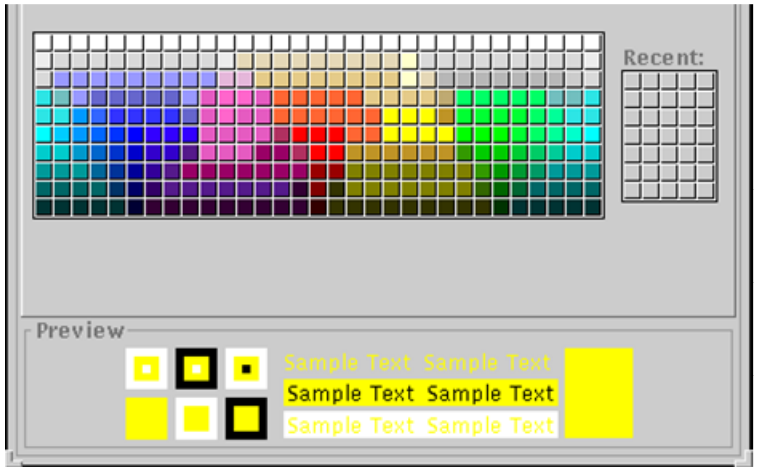
- `public JFileChooser()`
- `public JFileChooser(String currentDir)`

- `public int showOpenDialog(Component parent)`
- `public int showSaveDialog(Component parent)`
- `public File getSelectedFile()`

- `public static int APPROVE_OPTION, CANCEL_OPTION`
  Possible result values from showXxxDialog(...)

JColorChooser

a dialog box that allows the user to choose a color from a palette



- `public JColorChooser()`
- `public JColorChooser(Color initial)`
- `public Color showDialog(Component parent, String title, Color initialColor)`
  - returns `null` if user chooses the Cancel button

JMenuBar

a drop-down menu of commands

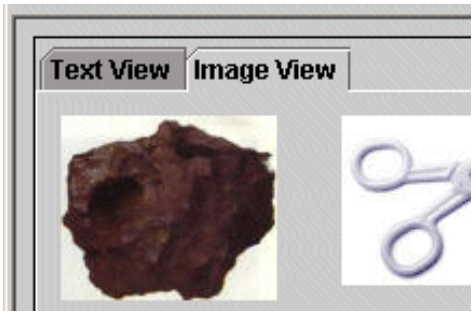
- `public JMenuBar()`
- `public void add(JMenu menu)`

Usage: in `JFrame`, the following method exists:

- `public void setJMenuBar(JMenuBar bar)`

JTabbedPane

a container that holds subcontainers, each with a "tab" label and content

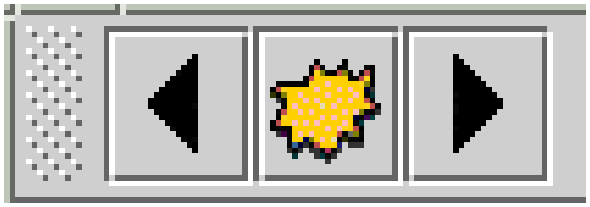


- `public JTabbedPane()`
  `public JTabbedPane(int tabAlignment)`
  Constructs a new tabbed pane. Defaults to having the tabs on top; can be set to `JTabbedPane.BOTTOM`, `LEFT`, `RIGHT`, etc.

- `public void addTab(String title, Component comp)`
- `public void insertTab(...)`
- `public void remove(Component comp)`
- `public void remove(int index)`
- `public void removeAll()`
- `public void setSelectedComponent(Component c)`
- `public void setSelectedIndex(int index)`

JToolbar

a movable dock container to hold common app buttons and commands



- `public JToolBar()`
- `public JToolBar(int orientation)`
- `public JToolBar(String title)`
- `public JToolBar(String title, int orientation)`

  Constructs a new tool bar, with optional title and orientation; can be `JToolBar.HORIZONTAL` or `VERTICAL`, default horizontal

- `public void add(Component comp)`

  Adds the given component to this tool bar.
  - Note: If using JToolbar, don't put other components in N/E/S/W.

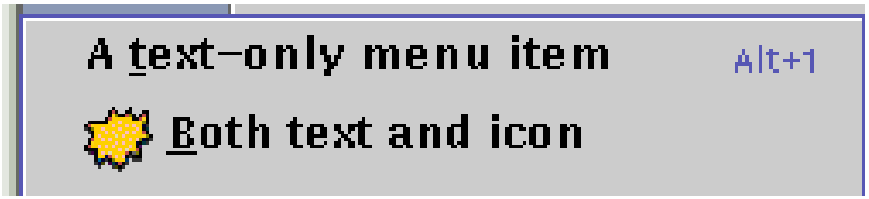
JMenu

a sub-menu of commands with a JMenuBar

- `public JMenu(String text)`
- `public void add(JMenuItem item)`
- `public void addSeparator()`
- `public void setMnemonic(int key)`

JMenuItem

an entry within a JMenu that can be clicked to execute a command



- `public JMenuItem(String text)`
- `public JMenuItem(String text, Icon icon)`
- `public JMenuItem(String text, int mnemonic)`

- `public void setAccelerator(KeyStroke ks)`
- `public void setEnabled(boolean b)`
- `public void setMnemonic(int mnemonic)`

- `public void addActionListener(ActionListener al)`

J(CheckBox|RadioButton)MenuItem

a JMenuItem with a check box or radio circle

- `public J_____MenuItem(String text)`
- `public J_____MenuItem(String text, boolean selected)`
- `public J_____MenuItem(String text, Icon icon)`
- `public J_____MenuItem(String text, Icon icon, boolean selected)`
- `public void addActionListener(ActionListener al)`
- `public boolean isSelected()`
- `public void setSelected(boolean b)`

Recall: in a `ButtonGroup`, the following method exists:

- `public void add(AbstractButton button)`
- These two classes extend `AbstractButton`.

Mnemonics

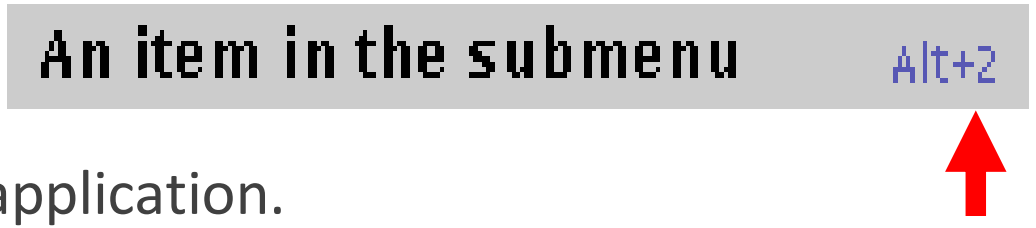
- **mnemonic:** A context-sensitive menu hotkey assigned to a specific button or other graphical component.
  - Usually visible as an underlined key, activated by pressing Alt+*key*.
  - Only works when input focus is on the appropriate component.

  - *usage:* call `setMnemonic(char)` method
    - Menu items also have a constructor that takes a mnemonic.

```
myQuitButton.setMnemonic('Q');
JMenuItem myNewItem = new JMenuItem("New", 'N');
// or: myNewItem.setMnemonic('N');
```

Accelerators

- **accelerator**: A global hotkey that performs an action (ex: Alt-X to exit the program) even on components that aren't in focus / visible.

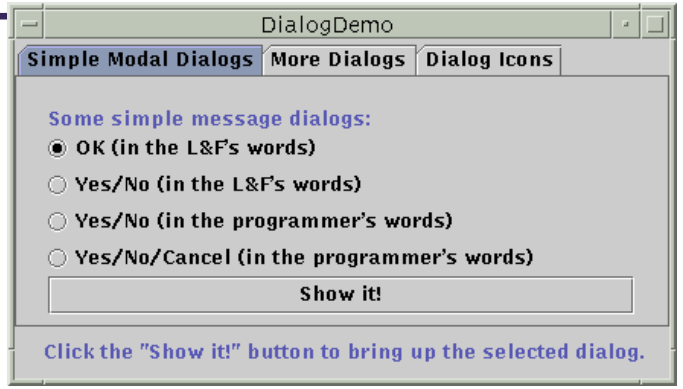


  - Can be run at any time in the application.
  - Can optionally include modifiers like Shift, Alt.
  - To create an accelerator:
    - Call the static `getKeyStroke` factory method of the `KeyStroke` class.
    - Pass its result to the `setAccelerator` method of the component.

```
menuItem.setAccelerator(
    KeyStroke.getKeyStroke('T',KeyEvent.ALT_MASK));
```

JDialog

a dialog box is a sub-window connected to a given main window frame that pops up for a short time



- `public JDialog(Frame parent, String title, boolean modal)`

  Constructs a new dialog with the given parent and title. If `modal` is set, this dialog is a child of the parent and the parent will be locked until the dialog is closed.

- `JDialog` has most all `JFrame` methods: `getContentPane()`, `setJMenuBar`, `setVisible`, `setTitle(String)`, …