

# Java Swing - Lecture 2 Components and Containment

Boriana Koleva  
(bnk@cs.nott.ac.uk)

1

---

---

---

---

---

---

---

---

## Components and Containers

- Components
  - ♦ The building blocks
  - ♦ Variety of uses and complexities
- Containers
  - ♦ The cement
  - ♦ Hierarchical organisation
  - ♦ Distinction is not always drawn

G5BUID - Java Swing - 2005

2

---

---

---

---

---

---

---

---

## Containment hierarchies

- Top level containers
  - ♦ Intermediate containers
    - Atomic components
- Viewing containment hierarchies
  - ♦ <Ctrl-Shift-F1>



G5BUID - Java Swing - 2005

3

---

---

---

---

---

---

---

---

## Top-level containers

- At the root of every containment hierarchy
- All Swing programs have at least one
- Content panes
- Types of top-level containers
  - Frames
  - Dialogs
  - Applets

G5BUID - Java Swing - 2005 4

---

---

---

---

---

---

---

---

## Frames

- Window with border, title and buttons
- Making frames
  - `JFrame frame = new JFrame();`  
Or a extend JFrame class (often better code this way).
- Style defined with

```
UIManager.setLookAndFeel(looknfeel);
SwingUtilities.updateComponentTreeUI(frame);
frame.pack();
```

G5BUID - Java Swing - 2005 5

---

---

---

---

---

---

---

---

## Some code! (a JFrame example)

```
//this won't compile...
public static void main(String[] args)
{
    JFrame frame = new JFrame("A JFrame"); //Just like any
                                           //other class

    // do things with frame
    frame.setJMenuBar(menuBar);
    frame.setContentPane(contentPane);
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);

    // set frame size
    frame.pack();

    // realize frame
    frame.setVisible(true);
} // end main
```

G5BUID - Java Swing - 2005 6

---

---

---

---

---

---

---

---

## Examples 1 + 2

- SwingApplication.java
  - ◆ Messy way.
- BetterSwingApp.java
  - ◆ Neater way.

G5BUID - Java Swing - 2005 7

---

---

---

---

---

---

---

---

## Dialog boxes

- More limited than frames
- Modality
- Types of dialogs
  - ◆ JOptionPane
  - ◆ ProgressMonitor
  - ◆ JColorChooser
  - ◆ JDialog

G5BUID - Java Swing - 2005 8

---

---

---

---

---

---

---

---

## Showing dialogs

- JOptionPane.showXYZDialog(...)
  - ◆ Option and Message dialogs
    - `JOptionPane.showMessageDialog(frame, "Error!", "An error message", JOptionPane.ERROR_MESSAGE);`
    - `JOptionPane.showOptionDialog(frame, "Save?", "A save dialog", JOptionPane.YES_NO_CANCEL_OPTION);`
  - ◆ Input, Confirm
- Customisation
  - ◆ showOptionDialog - Fairly customisable
  - ◆ JDialog - Totally customisable

G5BUID - Java Swing - 2005 9

---

---

---

---

---

---

---

---

## Example 3

- DialogDemo.java
  - ♦ Not looking at code in detail...

G5BUID - Java Swing - 2005 10

---

---

---

---

---

---

---

---

## Applets

- Not covered in great detail here
- JApplet is a top-level container
  - ♦ has menu bar and content pane support
- JApplet supports assistive technologies
- Requires Java plug-in for browser
  - ♦ consider user group

G5BUID - Java Swing - 2005 11

---

---

---

---

---

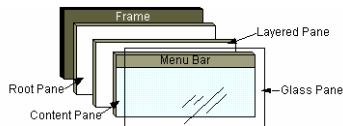
---

---

---

## Intermediate containers – Panels (or ‘panes’)

- Root panes
  - ♦ The content pane
  - ♦ Layered panes
  - ♦ Glass panes



G5BUID - Java Swing - 2005 12

---

---

---

---

---

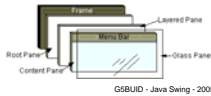
---

---

---

## Root panes

- 'Invisibly' attached to top-level container
- Created by Swing on realizing frame
- Manages everything between top-level container and components
- Places menu bar and content pane in an instance of JLayeredPane (see a couple of slides on)



13

---

---

---

---

---

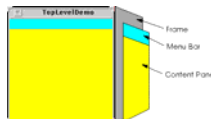
---

---

---

## Content panes

- Usually use a JPanel
- Contains everything except menu bar for most Swing applications
- Can be explicitly, or implicitly created,
  - ♦ see (simplified) code



```
//Create a panel and add components to it.  
JPanel contentPane = new JPanel();  
contentPane.add(someComponent);  
contentPane.add(anotherComponent);  
  
//Make it the content pane.  
contentPane.setOpaque(true);  
topLevelContainer.setContentPane(contentPane);
```

14

G5BUID - Java Swing - 2005

---

---

---

---

---

---

---

---

## Example 4

- TopLevelDemo.java
  - ♦ Illustrates the Content Pane, and Menu Bar positioning.

15

G5BUID - Java Swing - 2005

---

---

---

---

---

---

---

---

## Layered panes

- Provided by root pane, but can also be created
- Provides depth (z-buffering) to components
- 'Depth' is specified as integer
  - ♦ Frame content (-30000, content pane, menu bar)
  - ♦ Default (0, components)
  - ♦ Palette (100, toolbars and palettes)
  - ♦ Modal (200, internal dialogs)
  - ♦ Popup (300, external dialogs)
  - ♦ Drag (400, component when dragged)



16

G5BUID - Java Swing - 2005

---

---

---

---

---

---

---

---

## Example 5

- LayeredPaneDemo.java

17

G5BUID - Java Swing - 2005

---

---

---

---

---

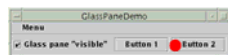
---

---

---

## Glass panes

- Not structured into components
  - ♦ event catching
  - ♦ painting
- Used for 'weird' interface behavior, rarely used.
- Either created explicitly or root version used



18

G5BUID - Java Swing - 2005

---

---

---

---

---

---

---

---

## Example 6

- GlassPaneDemo.java

G5BUID - Java Swing - 2005 19

---

---

---

---

---

---

---

---

## Components

- Content of your interface
  - ♦ <http://java.sun.com/docs/books/tutorial/uiswing/components/components.html>
- Created just like any class instance
  - ♦ `JButton button_ok = new JButton("OK");`
- Range in complexity from very simple (e.g. JButton) to very detailed (e.g. JColorChooser)



G5BUID - Java Swing - 2005 20

---

---

---

---

---

---

---

---

## Swing and AWT components - a quick reminder

- Mix Swing and AWT components as little as possible (not at all in most cases)
- Put 'J' in front of everything AWT provides to get Swing's counterpart
  - ♦ AWT: Button
  - ♦ Swing: JButton

G5BUID - Java Swing - 2005 21

---

---

---

---

---

---

---

---

## Atomic components (1)

- Buttons
- Combo boxes
- Lists
- Menus
- Sliders
- Text Fields
- Labels

22

---

---

---

---

---

---

---

---

## Atomic components (2)

- Tool tips
- Progress bars
- Colour choosers
- File choosers
- Tables
- Text
- Trees

23

---

---

---

---

---

---

---

---

## Atomic components (3)

- Impossible to teach the working of every type of component
- Very few people know it all! – Swing is HUGE.
- Remember to refer to:
  - ♦ The Java 2 API Documentation.
  - ♦ The Visual index to components & containers at [java.sun.com](http://java.sun.com):
    - <http://java.sun.com/docs/books/tutorial/uiswing/components/components.html>

24

---

---

---

---

---

---

---

---



## Summary

- Containers (Frames and Dialogs)
  - Hierarchy
  - Root Panes
  - Layered Panes
  - Content Panes
  - Glass Panes
- Components
  - Lots of 'em...
- Next time
  - Layout Management.

G5BUJD - Java Swing - 2005

25

---

---

---

---

---

---

---

---