

## Introduction to Programming Languages and Techniques



Swing II

11/6/09

## Office Hours

- My office hours have changed (again):
  - Monday 1:30-3 (as always)
  - Friday 4:30-5:30 (new)

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## WINDOWLISTENERS

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## Recall...

... our little demo program from last time

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## Problem

- When window is closed, program does not terminate.
- How to fix it?

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## The Easy Way

- `frame.setDefaultCloseOperation(  
EXIT_ON_CLOSE);`

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## More flexible: WindowListener

- Closing windows creates a **WindowEvent**
  - React to that event by terminating program
- A *WindowListener* handles this event and others

```
void windowActivated(WindowEvent e)
void windowClosing(WindowEvent e)
void windowClosed(WindowEvent e)
void windowDeActivated(WindowEvent e)
void windowDeiconified(WindowEvent e)
void windowIconified(WindowEvent e)
void windowOpened(WindowEvent e)
```

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## Terminator class

```
class Terminator implements WindowListener {
    public void windowClosing(WindowEvent e) {
        Window w = e.getWindow();
        // delete top-level frame, release OS resources,
        // generate WindowClosed event
        w.dispose();
    }

    public void windowClosed(WindowEvent e) {
        // terminate the application
        System.exit(0);
    }

    // other five methods do nothing
    void windowActivated(WindowEvent e) {}
    void windowDeActivated(WindowEvent e) {}
    void windowDeiconified(WindowEvent e) {}
    void windowIconified(WindowEvent e) {}
    void windowOpened(WindowEvent e) {}
}
```

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## Register WindowListener

```
public OnOffSwitch () {
    super("On/Off Switch"); // frame title

    this.addWindowListener(new Terminator());

    // create button and set its colors
    JButton button = new JButton("On/Off");
    button.setForeground(Color.black);
    button.setBackground(Color.white);

    // create and register button's listener:
    button.addActionListener(new Switcher());

    // add button to JFrame's content pane:
    this.getContentPane().add(button);
}
```

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## Problem

- A window listener must implement all 7 methods of **WindowListener** interface
- We only care about 2 of those methods  
→ lots of annoying boilerplate
- Solution: **WindowAdapter**

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## Adapter classes:

- Swing provides a collection of abstract *event adapter classes*
- These adapter classes implement listener interfaces with empty, do-nothing methods
- To implement a listener class, we *extend* an adapter class and override just the methods we need

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## Terminator class (II)

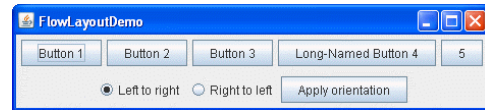
```
class Terminator extends WindowAdapter {
    public void windowClosing(WindowEvent e) {
        Window w = e.getWindow();
        w.dispose();
    }

    public void windowClosed(WindowEvent e) {
        System.exit(0);
    }
}
```

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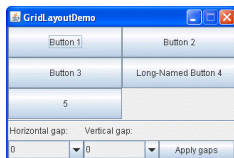
# LAYOUTS

## Flow Layout



- Items just “flow”
- Layout manager places them one after another
- (These and following examples taken from Java’s “The Swing Tutorial”)

## Grid Layout



This JPanel contains a Grid (2x3)

This JPanel contains another Grid (3x2)

- Places components in a grid of cells.
- Each component takes all the available space within its cell,
- Each cell is exactly the same size.

## Border Layout



- New “Position Relative” Names as of Java 1.4
  - Corresponds to NORTH, SOUTH, EAST, WEST, CENTER
  - Old names still work

## More Sophisticated Managers

- Include:
  - [BoxLayout](#)
  - [CardLayout](#)
  - [GridBagLayout](#)
  - [GroupLayout](#)
  - [SpringLayout](#)
- These are harder to use when coding by hand
- Layout tools such as NetBeans provide GUIs that write code for GUIs!

## Time for some more demos...

