

Lecture 7 Handout

Event handling and GUI Components with Swing

7.1 Software Framework

A *software framework* is a way of structuring generic solutions to a common problem, using polymorphism as a means of creating specialized solution for each new application.

- The power of any software framework comes through the use of a polymorphic variable (a variable declared as a parent type with a value from a child class)
- To specialize the design framework to a new application it is only necessary to override the appropriate methods (e.g. event listeners or paint) to define application-specific behavior.
- inheritance + overriding + polymorphism => software reuse

Examples of software frameworks: Java's Abstract Windowing Toolkit (AWT), Swing library

7.2 AWT/Swing Class Hierarchy

Study the class hierarchy of a JFrame class in the Java API documentation:

<http://docs.oracle.com/javase/7/docs/api/javax/swing/JFrame.html>

Activity 1

1. Draw the JFrame class library (starting from java.lang.Object)

- [illegible]

7.3 Swing GUI components

Activity 2: Study the following Swing GUI components, and summarize usages of each component (see a sample of the usages of JButton)

JButton, JLabel, JTextField, JTextArea, JCheckBox, JRadioButton, JComboBox, JList, JSlider, JMenuBar, JMenu, JMenuItem

Sample:

GUI component: JButton
(a) What is it used for?
We use a JButton object to represent a push button.
(b) How to create a JButton object?
JButton okButton = new JButton("I am OK.");
(c) JButton is an event source of type: ActionEvent , which is fired when a user clicks the button.
(d) To handle the ActionEvent of the JButton objects, we need to do the followings. <ol style="list-style-type: none">1. Create an event handler object which is an instance of a class that implements the ActionListener interface2. Register the created event handler to the JButton object by calling the method addActionListener3. The actionPerformed of the event handler will be called whenever the button is clicked Example <pre>okButton.addActionListener(new ActionListener() { public void actionPerformed(ActionEvent e) { JButton src = (JButton)e.getSource(); JOptionPane.showMessageDialog (null, src.getText()); } });</pre>