

Core Java

16. GUI Programming with Swing

AWT

- Abstract Windowing Toolkit
- AWT provides the basis for GUI components
- AWT provides ways for drawing primitives and dealing with pixels
- AWT provides classes for colors, font rasterization, image handling, clipboard handling and events
- Java2D is a set of extensions to AWT

Swing

- AWT had inconsistent look and feel
- Swing addressed many shortcomings of AWT
- Swing initially was a set of lightweight components (in Java)
- Swing has been reimplemented natively for performance
- Swing has been in Java for a long time
- Programming is based on AWT

Swing Components

- JWindow/JPanel/JFrame/JApplet
- JDialog
- JMenu
- JFileChooser
- JProgressBar
- JButton
- JTextField/JTextArea/JTextPane
- JCheckBox/JList/JRadioButton

Basics

- Create components and add them to the Container with a Layout
- Make them receive events and listen to them
- Receive data on an event
- Perform logic
- Override `paint()` if required and `repaint()`

Component

- *Components* have graphical representations
- They *paint()* with the help of *Graphics* (context) objects
- They are also *repaint()*ed when need be
- The background GUI worker handles the painting operation for us
- It allows one to add listeners to it

Container

- A *Container* is derived from *Component*
- It contains sub-*Components*
- Examples are *JPanel*, *JFrame* etc.
- Although many Swing components derive from *JComponent*, they don't contain sub-*Components*
- *Components* are positioned by *LayoutManagers*

Listener

- *Components* can throw events when the mouse is clicked, moved or dragged, when a key is pressed
- The object which uses these *Components* registers a *Listener* with these
- The GUI worker thread invokes methods of these *Listeners* depending on what was registered with the *Component*
- Hence, *Listener* methods are called asynchronously

Listener

- *ActionListener* can receive general events like button clicks, unchecking checkboxes
- *MouseListener*, *MouseMotionListener* and *MouseWheelListener* respond to Mouse clicks, motion and wheel movement respectively
- *KeyListener* can process keystrokes
- Many *EventListener* based classes available

Demonstration

- Compile and Execute a few programs

Questions?