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?