Topic Related Questions

**1.** **What is Swing?**

**Ans:-**

 Swing is a **Java GUI toolkit** (part of javax.swing package) used to create **graphical user interfaces**.

 It’s **platform-independent**, **lightweight**, and built on top of **AWT** (Abstract Window Toolkit).

**2.** **Difference between AWT and Swing?**

**Ans:-**

| **Feature** | **AWT** | **Swing** |
| --- | --- | --- |
| **Package** | java.awt | javax.swing |
| **Nature** | Heavyweight (uses OS components) | Lightweight (draws components in Java) |
| **Look & Feel** | OS-dependent | Pluggable Look & Feel |
| **Components** | Limited set | Rich set (tables, trees, etc.) |

**3.** **What is ActionListener?**

**Ans:-**

 ActionListener is a **functional interface** in java.awt.event used to handle **action events** like button clicks.

 It has **one method**:

void actionPerformed(ActionEvent e);

**4.** **How to manage layouts in Java?**

**Ans:**

 Java Swing uses **layout managers** to arrange components inside containers.

 Common Layout Managers:

* FlowLayout – Places components left to right, wraps to next line.
* BorderLayout – Splits container into NORTH, SOUTH, EAST, WEST, CENTER.
* GridLayout – Arranges components in equal rows & columns.

**5.** **What is the Event Dispatch Thread?**

**Ans:-**

 The **EDT** is a special thread in Swing responsible for **handling all GUI events** (button clicks, key presses, repainting).

 All Swing component updates should be done **on the EDT** to avoid concurrency issues.

 Example:

SwingUtilities.invokeLater(() -> new MyGUI().setVisible(true));

**6.** **What are the GUI components in Java?**

**Ans:-**

 **Top-level containers**: JFrame, JDialog, JApplet.

 **Control components**: JButton, JTextField, JLabel, JCheckBox, JRadioButton.

 **Display components**: JTable, JTree, JList.

 **Containers**: JPanel, JScrollPane, JSplitPane, JTabbedPane.

**7.** **How to handle multiple events?**

**Ans:-**

 One class can **implement multiple listener interfaces**:

public class MyApp implements ActionListener, MouseListener { ... }

 Or, use **different anonymous inner classes / lambda expressions** for each component.

**8.** **What is JPanel vs JFrame?**

**Ans:-**

| **Feature** | **JPanel** | **JFrame** |
| --- | --- | --- |

|  |  |  |
| --- | --- | --- |
| **Purpose** | General-purpose container for grouping components | Top-level window |

|  |  |  |
| --- | --- | --- |
| **Can it exist alone?** | No, must be added to a container | Yes, it’s a standalone window |

|  |  |  |
| --- | --- | --- |
| **Has title bar?** | No | Yes |

**9.** **How to add scroll bar in GUI?**

**Ans:-**

 Use JScrollPane to wrap components that can have more content than fits on screen.

 Example:

java

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JTextArea textArea = new JTextArea(10, 30);

JScrollPane scrollPane = new JScrollPane(textArea);

add(scrollPane);

**10.** **What is MVC architecture?**

**Ans:-**

 **MVC** = **Model – View – Controller**.

 **Model** → Handles data & business logic.

 **View** → UI components, how data is displayed.

 **Controller** → Handles user interaction, updates model & view.

 Benefits:

* Separation of concerns.
* Easier maintenance & testing.