

Java Theory and Practical Exam Preparation

1. Thread Methods

- a) wait(): Causes the current thread to wait until another thread invokes notify() or notifyAll(). Must be in synchronized block.
- b) notify(): Wakes up a single thread that is waiting on this object's monitor.

2. Define Error and Its Types

Error: Serious issues not intended to be caught by applications.

Types:

- OutOfMemoryError
- StackOverflowError
- VirtualMachineError

3. More Thread Methods

- a) suspend(): (Deprecated) Suspends thread, can cause deadlocks.
- b) resume(): (Deprecated) Resumes suspended thread.
- c) yield(): Suggests that the current thread pause to allow others to execute.
- d) wait(): Already covered.

4. Advanced Swing Components

- JTabbedPane
- JTree
- JTable
- JScrollPane
- JProgressBar
- JToolTip

5. Key Features of Swing

- Lightweight
- Platform-independent
- MVC architecture
- Rich GUI components
- Pluggable Look and Feel

6. FlowLayout vs BorderLayout

FlowLayout: Left-to-right layout like text.

BorderLayout: Divides into North, South, East, West, Center.

7. What is Swing?

Swing is Java's GUI toolkit that provides a rich set of lightweight components built on AWT.

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8. Program: Invalid Age Exception

```
class InvalidAgeException extends Exception {
    InvalidAgeException(String msg) { super(msg); }
}
public class AgeCheck {
    public static void main(String[] args) throws InvalidAgeException {
        int age = 16;
        if (age < 18) throw new InvalidAgeException("Invalid Age: Must be 18+");
    }
}
```

Common Exceptions:

- NullPointerException
- ArrayIndexOutOfBoundsException

9. Listener Interfaces

- ActionListener: Handles actions like button clicks
- ItemListener: For checkboxes and choices
- KeyListener: Key presses and releases
- MouseListener: Mouse clicks, press, release
- MouseMotionListener: Mouse movement
- TextListener: Text change (AWT only)

10. AWT vs Swing

AWT: Heavyweight, native UI, less flexible

Swing: Lightweight, pluggable look-and-feel, richer components

11. Program: Two Threads (Normal & Reverse)

```
class PrintAscending extends Thread {
    public void run() { for (int i = 1; i <= 50; i++) System.out.println("Asc: " + i); }
}
class PrintDescending extends Thread {
    public void run() { for (int i = 50; i >= 1; i--) System.out.println("Desc: " + i); }
}
public class ThreadTest {
    public static void main(String[] args) {
        new PrintAscending().start();
        new PrintDescending().start();
    }
}
```

12. Swing Components Explained

- Tabbed Panes: Multiple tabs
- Scroll Panes: Scrollbars

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- Trees: Hierarchical data
- Tables: Tabular data
- Progress Bar: Task progress
- Tool Tips: Hover information

13. Program: NoMatchException

```
class NoMatchException extends Exception {
    NoMatchException(String msg) { super(msg); }
}
public class PasswordCheck {
    public static void main(String[] args) throws NoMatchException {
        String password = "MSBTE";
        if ("MSBTE".equals(password)) throw new NoMatchException("No Match");
    }
}
```

14. Program: Negative Age Exception

```
class NegativeAgeException extends Exception {
    NegativeAgeException(String msg) { super(msg); }
}
public class PersonInfo {
    public static void main(String[] args) throws NegativeAgeException {
        int age = -5;
        if (age < 0) throw new NegativeAgeException("Negative Age");
    }
}
```

15. What is an Exception?

Exception: Event disrupting normal flow.

Types:

- Checked (e.g., IOException)
- Unchecked (e.g., ArithmeticException)

Why Handle:

- Prevent crashes
- Graceful recovery
- Debugging aid

