

Java Recap for Full Stack Development

1. Java Basics

History and features of Java

Java was developed by Sun Microsystems and is known for its platform independence, object-oriented approach, and robustness.

Java Architecture (JVM, JRE, JDK)

JVM runs Java bytecode, JRE includes JVM and libraries, JDK includes JRE plus development tools.

Data Types, Variables, and Operators

Java supports primitive and reference types. Operators include arithmetic, relational, logical, and assignment.

Control Statements

Used to control flow: if, if-else, switch, for, while, and do-while loops.

Input/Output

Scanner and BufferedReader are used to read input from the console or files.

2. Object-Oriented Programming (OOP)

Class and Object

A class is a blueprint; objects are instances of classes.

Constructor and Destructor

Constructors initialize objects. Java has no destructor; garbage collection handles cleanup.

Inheritance

Allows one class to inherit fields and methods from another using 'extends' keyword.

Polymorphism

Compile-time (method overloading) and Runtime (method overriding) let the same method behave differently.

Abstraction

Using abstract classes and interfaces to hide implementation details and show only functionality.

Encapsulation

Wrapping data and code into a single unit using private access modifiers and getters/setters.

3. Arrays and Strings

Arrays

Fixed-size containers for elements of the same type. Can be single or multidimensional.

Strings

Immutable sequences of characters. Use String, StringBuffer (mutable), and StringBuilder (faster).

4. Exception Handling

try-catch-finally

Handles runtime errors. 'finally' executes regardless of exception.

throw and throws

'throw' is used to explicitly throw an exception. 'throws' declares exceptions in method signatures.

Custom Exceptions

User-defined classes that extend Exception or RuntimeException.

5. Java Collections Framework

List, Set, Map Interfaces

List maintains order, Set avoids duplicates, Map stores key-value pairs.

ArrayList, LinkedList

ArrayList uses arrays internally; LinkedList uses doubly linked lists.

HashSet, TreeSet

HashSet is unordered, TreeSet maintains ascending order.

HashMap, TreeMap

HashMap allows null keys; TreeMap is sorted and does not allow null keys.

Iterator and for-each

Used for traversing collections efficiently.