**INTERVIEW QUESTIONS - 35**

**Basic Java Concepts**

1. **What is Java?**  
   Java is a high-level, object-oriented programming language developed by Sun Microsystems (now owned by Oracle). It is platform-independent due to its "Write Once, Run Anywhere" (WORA) capability enabled by the Java Virtual Machine (JVM).
2. **What are the main features of Java?**
   * Object-Oriented
   * Platform-Independent
   * Multi-threaded
   * Robust and Secure
   * Automatic Memory Management (Garbage Collection)
   * High Performance (JIT Compiler)
3. **What is the difference between JDK, JRE, and JVM?**
   * **JDK (Java Development Kit)**: Includes JRE and development tools like compilers.
   * **JRE (Java Runtime Environment)**: Provides libraries and JVM to run Java applications.
   * **JVM (Java Virtual Machine)**: Converts bytecode into machine code for execution.
4. **What are primitive data types in Java?**
   * **Integer Types**: byte, short, int, long
   * **Floating-Point Types**: float, double
   * **Character Type**: char
   * **Boolean Type**: boolean
5. **What is type casting in Java?**
   * **Implicit Casting (Widening)**: int → long → float → double
   * **Explicit Casting (Narrowing)**: double → float → long → int

**OOPs (Object-Oriented Programming)**

1. **What are the four pillars of OOP?**
   * Encapsulation
   * Inheritance
   * Polymorphism
   * Abstraction
2. **What is encapsulation in Java?**  
   Encapsulation is the concept of wrapping data (variables) and code (methods) together into a single unit (class) and restricting access using access modifiers (private, public, etc.).
3. **What is inheritance?**  
   Inheritance allows one class to acquire properties and behaviors of another class using the extends keyword.
4. **What is method overloading and method overriding?**
   * **Overloading**: Multiple methods with the same name but different parameters in the same class.
   * **Overriding**: Redefining a method in a subclass that is already defined in a parent class.
5. **What is the difference between abstract class and interface?**

* **Abstract Class**: Can have abstract and concrete methods, supports constructors.
* **Interface**: Can only have abstract methods (before Java 8), supports multiple inheritance.

**Exception Handling**

1. **What is exception handling?**  
   Exception handling is a mechanism to handle runtime errors using try, catch, finally, throw, and throws.
2. **What is the difference between checked and unchecked exceptions?**

* **Checked Exceptions**: Checked at compile-time (e.g., IOException).
* **Unchecked Exceptions**: Checked at runtime (e.g., NullPointerException).

1. **What is the difference between throw and throws?**

* throw: Used to explicitly throw an exception.
* throws: Declares exceptions in the method signature.

1. **What is finally block?**  
   The finally block contains cleanup code and executes regardless of an exception occurring or not.
2. **Can we have multiple catch blocks?**  
   Yes, multiple catch blocks can be used for different exception types.

**Multithreading**

1. **What is multithreading?**  
   Multithreading allows concurrent execution of multiple threads to maximize CPU utilization.
2. **What are the two ways to create a thread?**

* Extending Thread class
* Implementing Runnable interface

1. **What is the difference between Runnable and Callable?**

* Runnable: Does not return a result and cannot throw checked exceptions.
* Callable: Returns a result (Future<V>) and can throw checked exceptions.

1. **What is synchronization in Java?**  
   Synchronization ensures that multiple threads do not access shared resources simultaneously, preventing data inconsistency.
2. **What is a deadlock?**  
   A deadlock occurs when two or more threads are waiting for each other’s resources indefinitely.

**Java Collections Framework**

1. **What is the Java Collections Framework?**  
   It is a set of interfaces and classes to store and manipulate groups of objects efficiently.
2. **What is the difference between ArrayList and LinkedList?**

* **ArrayList**: Faster for retrieval, uses dynamic array.
* **LinkedList**: Faster for insertion/deletion, uses doubly linked list.

1. **What is the difference between HashSet and TreeSet?**

* HashSet: Unordered, allows null, uses hashing.
* TreeSet: Ordered (sorted), does not allow null.

1. **What is the difference between HashMap and Hashtable?**

* HashMap: Not synchronized, allows null keys/values.
* Hashtable: Synchronized, does not allow null.

1. **What is ConcurrentHashMap?**  
   It is a thread-safe version of HashMap that supports concurrent access.

**Java 8 Features**

1. **What are the key features of Java 8?**

* Lambda Expressions
* Stream API
* Functional Interfaces
* Default and Static Methods in Interfaces
* Optional Class

1. **What is a Lambda Expression?**  
   A lambda expression is an anonymous function that simplifies code, mainly used in functional programming.
2. **What is the Stream API?**  
   Stream API provides functional-style operations to process collections efficiently.
3. **What is a Functional Interface?**  
   A Functional Interface has exactly one abstract method (e.g., Runnable, Callable).
4. **What is the Optional class?**  
   It is a container class that handles null values to avoid NullPointerException.

**Miscellaneous**

1. **What is garbage collection in Java?**  
   Garbage collection automatically deallocates memory occupied by unused objects.
2. **What are strong, weak, soft, and phantom references?**

* **Strong**: Normal reference, prevents garbage collection.
* **Weak**: Collected when no strong reference exists.
* **Soft**: Collected before an OutOfMemoryError.
* **Phantom**: Collected only after finalization.

1. **What is the difference between final, finally, and finalize?**

* final: Used to declare constants, prevent inheritance/method overriding.
* finally: Used in exception handling for cleanup.
* finalize: Called by garbage collector before object deletion.

1. **What is the difference between == and .equals()?**

* ==: Compares memory reference.
* .equals(): Compares object content.

1. **What is the difference between String, StringBuffer, and StringBuilder?**

* String: Immutable.
* StringBuffer: Mutable, thread-safe.
* StringBuilder: Mutable, non-thread-safe.