☕ Java Interview Questions and Answers (1–50)

1. What is Java?

Answer: Java is a high-level, object-oriented, class-based programming language developed by Sun Microsystems (now owned by Oracle). It's platform-independent thanks to the JVM.

2. What is the JVM?

Answer: Java Virtual Machine – It interprets compiled Java bytecode and enables Java programs to run on any device.

3. What is JDK, JRE, and JVM?

Answer:

- **JDK (Java Development Kit):** Development tools + JRE
- **JRE (Java Runtime Environment):** JVM + libraries
- **JVM:** The engine that executes Java bytecode

4. What are the features of Java?

Answer: Platform-independent, object-oriented, simple, secure, portable, robust, multithreaded.

5. What is the difference between JDK and JRE?

Answer:

- **JDK:** For development
- **JRE:** For running Java applications

6. What is a class in Java?

Answer: A blueprint for creating objects containing fields and methods.

7. What is an object in Java?

Answer: An instance of a class that contains its state and behavior.

8. What is the main method in Java?

Answer: `public static void main(String[] args)` – entry point of any Java program.

9. What is the difference between == and `.equals()`?

Answer:

- `==` compares references
- `.equals()` compares object contents

10. What are data types in Java?

Answer:

- **Primitive types:** int, float, double, char, boolean, etc.
- **Non-primitive types:** Objects, arrays, strings.

11. What is method overloading?

Answer: Same method name with different parameters in the same class.

12. What is method overriding?

Answer: Subclass provides its own implementation of a method declared in the parent class.

13. What is inheritance in Java?

Answer: Mechanism to acquire the properties of a parent class using `extends`.

14. What is encapsulation?

Answer: Wrapping data and code into a single unit (class), usually with private variables and public getters/setters.

15. What is abstraction?

Answer: Hiding internal implementation and showing only the necessary details.

16. What is polymorphism?

Answer: Ability of an object to take many forms (method overloading and overriding).

17. What are constructors in Java?

Answer: Special methods used to initialize objects.

18. What is the difference between `this` and `super`?

Answer:

- `this` refers to current class
- `super` refers to parent class

19. What is an interface in Java?

Answer: A contract with only method declarations; implementing class must define the methods.

20. What is the difference between abstract class and interface?

Answer:

- Abstract class can have method bodies
- Interface has only method declarations (until Java 8+ allowed default methods)

21. What is a package in Java?

Answer: A namespace that organizes classes and interfaces.

22. What is the access modifier in Java?

Answer: Controls the visibility of classes and members – `public`, `private`, `protected`, and default.

23. What is a static keyword?

Answer: Denotes that a method or variable belongs to the class rather than instances.

24. What is final keyword?

Answer: Used to define constants, prevent method overriding, or inheritance of a class.

25. What is exception handling in Java?

Answer: Mechanism to handle runtime errors using `try`, `catch`, `finally`, and `throw`.

26. What is the difference between `throw` and `throws`?

Answer:

- `throw`: used to throw an exception
- `throws`: declares an exception

27. What are checked and unchecked exceptions?

Answer:

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

28. What is the use of `finally` block?

Answer: Executes regardless of exception thrown or not.

29. What is the difference between Array and ArrayList?

Answer:

- Array: fixed size
- ArrayList: resizable, part of Java Collections

30. What is the Collection framework?

Answer: Provides classes and interfaces to store and manipulate groups of data as a single unit.

31. What are commonly used collection classes?

Answer: `ArrayList`, `HashMap`, `HashSet`, `LinkedList`, `TreeMap`, etc.

32. What is the difference between List and Set?

Answer:

- List: ordered, allows duplicates
- Set: unordered, no duplicates

33. What is a Map in Java?

Answer: Stores key-value pairs. Example: `HashMap`, `TreeMap`

34. What is multithreading in Java?

Answer: Allows multiple threads to execute concurrently.

35. What is synchronization in Java?

Answer: A technique to prevent thread interference using the `synchronized` keyword.

36. What is the difference between `wait()` and `sleep()`?

Answer:

- `wait()` releases the lock
- `sleep()` holds the lock

37. What is garbage collection in Java?

Answer: Automatic memory management – removes unused objects.

38. What is the difference between stack and heap memory?

Answer:

- Stack: stores method calls and local variables
- Heap: stores objects and global variables

39. What is serialization in Java?

Answer: Process of converting an object into a byte stream.

40. What is transient keyword?

Answer: Prevents a variable from being serialized.

41. What is a lambda expression in Java 8?

Answer: Provides a concise way to represent anonymous functions.

42. What is a stream in Java?

Answer: Java 8 feature for functional-style operations on collections.

43. What is Optional in Java 8?

Answer: A container object that may or may not contain a non-null value.

44. What is the difference between == and `.equals()` for strings?

Answer:

- `==`: checks reference
- `.equals()`: checks content

45. What is the String pool?

Answer: Memory area where JVM stores literal strings to optimize memory.

46. What are wrapper classes in Java?

Answer: Convert primitives to objects (e.g., `int` to `Integer`).

47. What is autoboxing and unboxing?

Answer: Automatic conversion between primitive types and wrapper classes.

48. What are annotations in Java?

Answer: Metadata used to provide data about the program (e.g., `@Override`, `@Deprecated`)

49. What is reflection in Java?

Answer: Allows inspection and modification of classes and objects at runtime.

50. What are enums in Java?

Answer: A special data type to define a set of constants.