TOP 20 JAVA INTERVIEW QUESTIONS

1. What is the difference between JDK, JRE, and JVM?

- **JDK** (Java Development Kit) includes tools for developing Java applications, including the JRE and compilers.
- **JRE** (Java Runtime Environment) provides the libraries and environment to run Java applications.
- **JVM** (Java Virtual Machine) is the engine that runs Java bytecode.

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2. What are the main features of Java?

- Object-Oriented, Platform-Independent (Write Once, Run Anywhere), Robust (exception handling, garbage collection), Multithreaded, and Secure.

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3. Explain the concept of Object-Oriented Programming (OOP) in Java.

- **Encapsulation**: Bundling data with methods that operate on it.
- **Inheritance**: Deriving new classes from existing ones.
- **Polymorphism**: Using a single interface to represent different types.
- **Abstraction**: Hiding complex implementation details and showing only the necessary features.

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4. What is the difference between `==` and `equals()` in Java?

- `==` compares object references.
- `equals()` compares the content/values of objects.

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5. What is a constructor in Java?

- A constructor is a special method used to initialize objects. It is called when an object is created and can be overloaded.

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6. What is the difference between an interface and an abstract class in Java?

- **Abstract Class**: Can have abstract and concrete methods, and can have constructors.
- **Interface**: Only abstract methods (until Java 8 added default and static methods), used for full abstraction, supports multiple inheritance through implementation.

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7. What is the difference between `ArrayList` and `LinkedList` in Java?

- **ArrayList**: Resizable array, better for random access.
- **LinkedList**: Doubly linked list, better for frequent insertions and deletions.

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8. What is the significance of the `final` keyword in Java?

- **Final Class**: Cannot be subclassed.
- **Final Method**: Cannot be overridden.
- **Final Variable**: Value cannot be changed once assigned.

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9. What is exception handling in Java?

- Exception handling in Java is managing runtime errors using `try`, `catch`, `finally`, and `throw`/`throws` to maintain normal program flow.

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10. What is the difference between checked and unchecked exceptions in Java?

- **Checked Exceptions**: Must be handled or declared using `throws` (e.g., IOException).
- **Unchecked Exceptions**: Do not require explicit handling (e.g., NullPointerException).

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11. What is multithreading in Java?

- Multithreading is the concurrent execution of two or more threads to maximize CPU utilization. Java supports it via the `Thread` class and `Runnable` interface.

12. What is the difference between `String`, `StringBuilder`, and `StringBuffer`?

- **String**: Immutable sequence of characters.
- **StringBuilder**: Mutable, not thread-safe, better performance.
- **StringBuffer**: Mutable, thread-safe, slower due to synchronization.

13. What are Java Streams in Java 8?

- Streams are used to process collections of objects in a functional programming style, offering operations like `filter`, `map`, and `reduce`.

14. What is garbage collection in Java?

- Garbage collection is the automatic process of reclaiming memory by removing objects that are no longer in use, managed by the JVM.

15. What is the purpose of the `static` keyword in Java?

- **Static Variable**: Shared among all instances of a class.
- **Static Method**: Belongs to the class rather than an instance.
- **Static Block**: Executes when the class is loaded.

16. What are Lambda Expressions in Java?

- Lambda expressions provide a clear and concise way to implement functional interfaces using an expression syntax, introduced in Java 8.

17. What is the `volatile` keyword in Java?

- `volatile` is used for variables that can be accessed by multiple threads, ensuring visibility of changes across threads.

18. Explain the concept of `synchronized` in Java.

- The `synchronized` keyword ensures that only one thread can access a block of code or method at a time, preventing race conditions.

19. What is the Java Memory Model?

- The Java Memory Model defines how threads interact through memory and how changes made by one thread become visible to others. It includes concepts like **happens-before**, **volatile**, and **synchronization**.

20. What is the `Optional` class in Java 8?

- `Optional` is a container class that helps avoid `NullPointerException` by representing values that may or may not be present.