150 Java Questions and Answers

1. What is Java?

Answer: Java is a high-level, object-oriented programming language developed by Sun Microsystems in 1995. It is platform-independent due to the JVM.

2. What is JVM?

Answer: JVM (Java Virtual Machine) is a virtual machine that runs Java bytecode and enables Java's platform independence.

3. What is JRE?

Answer: JRE (Java Runtime Environment) is a package that provides the libraries and JVM to run Java applications.

4. What is JDK?

Answer: JDK (Java Development Kit) provides tools to develop Java programs along with JRE.

5. What is bytecode?

Answer: Bytecode is intermediate code generated by the Java compiler and executed by the JVM.

6. Is Java a compiled or interpreted language?

Answer: Java is both; it is compiled into bytecode and then interpreted by the JVM.

7. What is a class in Java?

Answer: A class is a blueprint for creating objects with specific properties and methods.

8. What is an object in Java?

Answer: An object is an instance of a class with its own state and behavior.

9. What is the main method in Java?

Answer: It is the entry point of a Java program: public static void main(String[] args).

10. What are data types in Java?

Answer: Data types define the type of data a variable can hold: int, float, char, boolean, etc.

11. What are Java access modifiers?

Answer: Access modifiers control visibility: public, private, protected, and default.

12. What is a constructor?

Answer: A constructor initializes an object and is called when the object is created.

13. What is method overloading?

Answer: Method overloading means having multiple methods with the same name but different parameters.

14. What is method overriding?

Answer: Method overriding means redefining a superclass method in a subclass.

15. What is inheritance in Java?

Answer: Inheritance allows one class to acquire properties and methods of another class.

16. What is polymorphism?

Answer: Polymorphism means one interface can be used for different data types or methods.

17. What is abstraction?

Answer: Abstraction hides internal details and shows only essential features.

18. What is encapsulation?

Answer: Encapsulation binds data and methods into a single unit and restricts access.

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

Answer: == checks reference equality, equals() checks value equality.

20. What are wrapper classes in Java?

Answer: Wrapper classes convert primitives into objects (e.g., int to Integer).

21. What is an interface?

Answer: An interface is a contract with abstract methods that a class implements.

22. What is an abstract class?

Answer: An abstract class can have both abstract and non-abstract methods.

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

Answer: Interfaces have only abstract methods (until Java 8), abstract classes can have concrete methods.

24. What is the use of final keyword?

Answer: final is used to declare constants, prevent method overriding or inheritance.

25. What is the difference between static and non-static methods?

Answer: Static methods belong to the class; non-static belong to objects.

26. What is the this keyword?

Answer: this refers to the current object instance.

27. What is the super keyword?

Answer: super refers to the parent class object.

28. What are packages in Java?

Answer: Packages are namespaces that organize classes and interfaces.

29. What is exception handling?

Answer: Exception handling manages runtime errors using try, catch, and finally blocks.

30. What are checked and unchecked exceptions?

Answer: Checked exceptions are checked at compile-time; unchecked at runtime.

31. What is a try-catch block?

Answer: A block to handle exceptions where try runs code and catch handles errors.

32. What is a finally block?

Answer: A block that always executes after try-catch, used for cleanup.

33. What is throw and throws?

Answer: throw is used to throw an exception; throws declares it.

34. What is garbage collection?

Answer: Garbage collection automatically deallocates memory for unused objects.

35. What is the difference between List and Set?

Answer: List allows duplicates and is ordered; Set is unordered and disallows duplicates.

36. What is HashMap in Java?

Answer: HashMap is a data structure that stores key-value pairs with unique keys.

37. What is the difference between HashMap and Hashtable?

Answer: Hashtable is synchronized, HashMap is not.

38. What is synchronization?

Answer: Synchronization prevents concurrent access issues in multithreading.

39. What is multithreading?

Answer: Multithreading allows multiple threads to run concurrently.

40. What is the difference between process and thread?

Answer: A process is an independent program; a thread is a lightweight subprocess.

41. What is the Runnable interface?

Answer: Runnable is used to define a thread by implementing run().

42. How to create a thread in Java?

Answer: By extending Thread class or implementing Runnable interface.

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

Answer: wait() releases the lock, sleep() doesn't.

44. What is deadlock?

Answer: Deadlock is a situation where threads are blocked waiting on each other.

45. What is a lambda expression?

Answer: Lambda expressions provide a concise way to implement functional interfaces.

46. What is functional interface?

Answer: An interface with a single abstract method.

47. What are streams in Java 8?

Answer: Streams process collections in a functional style.

48. What is Optional in Java 8?

Answer: Optional is a container to avoid null values.

49. What is method reference?

Answer: A shorthand for calling a method using :: operator.

50. What is serialization?

Answer: Serialization converts an object to a byte stream.

51. What is the transient keyword?

Answer: transient prevents variables from being serialized.

52. What is reflection in Java?

Answer: Reflection allows inspection and modification of classes at runtime.

53. What is a singleton class?

Answer: A singleton allows only one instance of a class.

54. How to make a class immutable?

Answer: By making fields final and private, and not providing setters.

55. What is the difference between equals() and hashCode()?

Answer: equals() checks equality, hashCode() returns object's hash value.

56. What is the Java Memory Model?

Answer: Defines how threads interact through memory.

57. What is a volatile variable?

Answer: Volatile ensures visibility of changes to variables across threads.

58. What is the default value of int?

Answer: The default value of int is 0.

59. What is autoboxing?

Answer: Automatic conversion of primitive types to wrapper classes.

60. What is unboxing?

Answer: Conversion of wrapper classes to primitive types.

61. What is the diamond operator?

Answer: <> allows type inference with generics.

62. What is an enum?

Answer: Enum is a special class for a group of constants.

63. What is a marker interface?

Answer: An interface with no methods, e.g., Serializable.

64. What is the difference between fail-fast and fail-safe?

Answer: Fail-fast throws ConcurrentModificationException; fail-safe does not.

65. What is the difference between ArrayList and Vector?

Answer: Vector is synchronized; ArrayList is not.

66. What is the difference between Comparator and Comparable?

Answer: Comparable sorts based on natural ordering; Comparator uses custom logic.

67. What is cloning in Java?

Answer: Cloning creates a copy of an object.

68. What is shallow and deep copy?

Answer: Shallow copy copies references; deep copy duplicates objects.

69. What is the use of instanceof?

Answer: instanceof checks if an object is an instance of a class.

70. What is method hiding?

Answer: When a static method in subclass hides one in superclass.

71. Can we override static methods?

Answer: No, static methods are not overridden.

72. Can we override private methods?

Answer: No, private methods are not visible to subclasses.

73. What is composition?

Answer: Using objects of other classes in your class to build functionality.

74. What is aggregation?

Answer: A HAS-A relationship with shared ownership.

75. What is association?

Answer: General relationship between two classes.

76. What is dependency injection?

Answer: Injecting dependencies instead of creating them manually.

77. What is the use of the 'new' keyword?

Answer: It is used to create objects.

78. What is a memory leak in Java?

Answer: Unreleased objects that are no longer used cause memory leaks.

79. What is the finalize() method?

Answer: Called by GC before an object is destroyed.

80. What is method chaining?

Answer: Calling multiple methods on the same object in a single line.

81. What is a constructor overloading?

Answer: Having multiple constructors with different parameters.

82. What are varargs?

Answer: Allows passing variable number of arguments to a method.

83. What is recursion?

Answer: A method calling itself.

84. What is a nested class?

Answer: A class defined within another class.

85. What is a static nested class?

Answer: A nested class declared static, doesn't require outer class instance.

86. What is annotation?

Answer: Metadata to provide data about a program.

87. What is a custom annotation?

Answer: User-defined annotation for metadata.

88. What is JavaDoc?

Answer: Tool for generating documentation from Java source code.

89. What is the default package in Java?

Answer: The unnamed package when no package is defined.

90. What is the difference between path and classpath?

Answer: path is OS-level; classpath is for locating classes and JARs.

91. What is the difference between public, private, protected?

Answer: public: accessible everywhere, private: within class, protected: package + subclasses.

92. What are static imports?

Answer: Import static members so they can be accessed without class name.

93. What is the main difference between Stack and Queue?

Answer: Stack: LIFO, Queue: FIFO.

94. What is the difference between throw and throws?

Answer: throw is used in code; throws in method declaration.

95. What is File class in Java?

Answer: It represents file and directory pathnames in abstract.

96. What is JavaBeans?

Answer: Reusable software component that follows conventions (getters/setters, serializable).

97. What is the difference between error and exception?

Answer: Errors are serious issues; exceptions can be handled.

98. What is the purpose of the instanceof operator?

Answer: To test if an object is an instance of a specific class.