JAVA

Q : Why is Java so popular ?

Two main reasons of popularity of Java
i. Platform Independent
ii. Object Oriented Programming

Q : Compare JDK vs JVM vs JRE .

JDK [JRE [JVM]]

JDK - Javac, jar, debugging tools, javap
JRE - java, Javaw, libraries, rt.jar
JVM - interpreter, JIT

Q : How java is Platform independent ? *(Build Once and Run anywhere)*

SourceCode (.java) -> Java Compiler(Build)-> ByteCode (.class) -> JVM (Interpreter + JIT) (Run)-> MachineCode. NB. This ByteCode is platform independent bcz JVM of any OS can run it.

Q : What is JIT compiler in Java ?

SourceCode (.java)->Java Compiler -> ByteCode (.class) -> JRE [JVM (Interpreter + JIT Compiler)] -> Machine code

Q : Why Java is not a fully object oriented programming language ?

Because of Primitive data types e.g int, float , double, long, short, char, boolean.
To make them object oriented we have wrapper class which actually wraps the primitive data type to an object of that class.

Q : Why Pointers are not used/discouraged in java ?

i. Increases the complexity of code.
ii. In order to avoid direct access to memory by the user. (users can do some faulty operation on those locations)
Note : In Java JVM is responsible for implicit memory allocation/deallocation(garbage Collector)

Q : Access Modifiers in Java

All classes should be modified by public keyword.

Access Modifiers : applicable on data members and methods.

Keyword	*Class*	*Package*	*Subclass*	*Word*
Public	*Y*	*Y*	*Y*	*Y*
Protected	*Y*	*Y*	*Y*	*N*
No Modifier	*Y*	*Y*	*N*	*N*
Private	*Y*	*N*	*N*	*N*

Q : What is local variable, instance variable and static variable/ class variables ?

Local variable : *A variable declared inside the body of a method or block or constructor is called a local variable.*
Instance variable : *A variable declared outside the method/block/constructor but inside the body is called an instance variable. (Non Static)*
Static/class variable : *Static variables are also known as class variables because they are associated with the class.*

Q : Why String is immutable in Java ?

Value of a String object is once created, can't be modified. Any modification on String object creates a new String object.

```
String str = "value1";
str.concat("value2");
System.out.println(str); // output : value1
```

NB. All wrapper class instances are immutable too. :3

Q : How can you make a class immutable ?

Declare the class as final so that it can't be extended and make all its data members as private. Don't provide any setter methods and Initialize all the fields via constructor performing deep copy.

Q : What is marker Interface ?

Having no data member and member function. An empty interface is called Marker Interface.
E.g. Serializable , Cloneable. Then why do we need this ? Bcz sometimes you need to inform the compiler , this is something related to cloning or serialization.

Q : What is method hiding ?

When super class and sub class contains same method including parameters and if they are static. Static methods are not polymorphic.
https://stackoverflow.com/questions/16313649/what-is-method-hiding-in-java-even-the-javadoc-explanation-is-confusing#:~:text=Method%20hiding%20means%20subclass%20has,is%20used%20to%20invoke%20it.

Q : Can you override a private or static method in java ?

You can not override a private or static method. Bcz private method can not be accessible from child class. And in case of static, it will be method hiding.

Q : Does Java support multiple inheritance ?
No. But we can achieve multiple inheritance through interface concepts.

Q : Usage of Final Keyword Java

Final variable : *In java, final variables are just like constants.*
Final method : *We can declare a* ***final method*** *by use of the* ***final keyword****. A final method can't be* ***overridden*** *in child class.*
Final class : *We can declare a class as a* ***final class*** *with the* ***final*** *keyword. If a class is a final class, then it can't be extended(inherited).*
NOTE: By use of final with classes is to create an immutable class like the predefined String class.

Q : Is Java "pass-by-value" or "pass-by-reference" ?
Java is always maintaining Pass by value. Strange !!!

Q : Difference between HashMap and HashTable ?

HashTable is synchronized i.e thread safe. It means two threads can't call the methods of HashTable simultaneously. HashTable doesn't allow null keys or values.

HashMap is unsynchronized i.e. not thread safe. It means two threads can call the methods of HashMap simultaneously. Might go in a Deadlock situation. HashMap allows one null key and any number of null values.

Q : What is the difference between Stringbuffer and Stringbuilder ?

StringBuffer is synchronized i.e. thread safe. It means two threads can't call the methods of StringBuffer simultaneously.
StringBuilder is non-synchronized i.e. not thread safe. It means two threads can call the methods of StringBuilder simultaneously.

Q : Explain Multithreading in Java.

A thread is the smallest unit of process or a lightweight sub-process. A program can have any number of sub-processes and each sub-process runs parallely by a thread. A thread behaves like a separate CPU executing the process.

When a process is executed by multiple threads concurrently is known as multithreading in java.

Q : Comparable vs Comparator in Java.

Comparable : *By use of Comparable interface, Object can compare itself with another object. You can provide a single sorting sequence only. It means you can compare the Objects of class based on single data members only.*

Comparator : *By use of Comparator interface, Object can compare itself with another object. You can provide a multiple sorting sequence. It means you can compare the Objects of class based on multiple data members.*

NOTE: All the Wrapper classes implement the Comparable interface by default.

Q : Explain Nested Class in java.
Nested static class exist. Treated same as static member variable.
https://javagoal.com/nested-classes-in-java/

Q : What is Anonymous class ?
In Java, a class can contain another class known as nested class. It's possible to create a nested class without giving any name. A nested class that doesn't have any name is known as an anonymous class.

Q : Difference between Heap and Stack Memory in java.
Local variables and Methods goes on Stack Memory.
Object/Instance variable goes on the Heap Memory.
https://www.youtube.com/watch?v=450maTzSIvA

Q : What is servlet and Life Cycle of Servlet ?
Return dynamic page after injected values. We don't need servlets bcz we have JSP.
youtube.com/watch?v=CRvcm7GKrFo

Q : Does interface contain member variables ?

Yep. But treated as final static.

Q. Difference between merge and quick sort algo.
Q.final , finally , finalize -> final keyword. Finally exception handling, finalize most probably acts like destructor.
Q. difference between == and equals(). == compare the reference and equals compare the value