

Q1) Components of JDK?

- = <sup>8</sup> Java Development Kit (JDK) includes the
  - <sup>9</sup> Java Runtime Environment development tool like the Java compiler & other utilities needed for Java development provides everything required to write, compile & run Java program

Q2) Diff b/w JDK, JVM, JRE

JDK	JVM	JRE
<sup>1</sup> Used for development of applications	<sup>2</sup> Provide runtime environment	<sup>3</sup> Provided by Java for run app
<sup>2</sup> Take consists of many development tools	<sup>3</sup> Does not consist any tool	<sup>4</sup> Consists of class lib & other files
<sup>3</sup> Platform dependent	<sup>4</sup> Platform independent	<sup>5</sup> Platform dependent
<sup>4</sup> = JVM is responsible for running Java bytecode providing an environment to run Java code	<sup>5</sup> JVM	<sup>6</sup> JVM is responsible for running Java bytecode providing an environment to run Java code
<sup>5</sup> & convert Java bytecode into machine code via interpreter		

Q3) Explain memory management system of JVM

- = JVM memory divided into regions like Heap, Stack, Cells & Local Garbage collection automatically reclaims memory by removing objects that are no longer referring

Q) What role does the JIT compiler & its role in the JVM? What is bytecode & why is it important for Java?

A) JIT compiler = part of JVM improves performance by compiling bytecode to native machine code at runtime.

Q) Bytecode = An intermediate code generated by Java compiler, which is platform independent & executed by JVM.

Q) How does Java achieve platform independence through the JVM?

A) Java code compiled into platform-independent bytecode (which JVM interprets) or compiled into native machine code specific to underlying platform, making Java platform-independent.

Q) What is the significance of the class loader in Java? What is process of garbage collection in Java?

A) Class loader = loads Java classes into memory dynamically during runtime, part of JVM architecture.

Q) Garbage collection: Automatically frees memory by deleting objects no longer in use avoiding memory leaks.



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- g) what are four access modifiers in Java & how do they differ from each other
- 1) public = Accessible from any class
  - 2) protected = Accessible within the same package & subclass
  - 3) default = Accessible only within the same package
  - 4) private = Accessible only within the same class

Q) what are diff b/w public, private, protected, & default

- 1) public - is open class
- 2) protected = Restricted & subclass < class
- 3) in same package
- 4) default - limited classes in same package

ii) can you override method with diff access modifier in subclass?

For ex can protected method in superclass be overridden with private method in subclass?

= A method can be override with a more permissive modifier

eg A protected method in superclass cannot be override with private method in subclass as it would violate access rule

- 1) What is difference between protected & default  
 - protected = visible in same package & sub-class  
 - default = visible only within same package

- 2) Is it possible to make class private in Java? If yes what are the limitations?  
 - inner class can be private, but top-level class cannot be private  
~~inner classes can be~~  
 This is used to encapsulate implementation details

- 3) Can a top level class in Java be declared as protected or private? Why or why not?  
 - Not allowed: Top level classes can only be public or package-private  
 accessible within the package to any class declared public

- 4) What happens if you declare a variable or method as private in class A try to access it from another class - with same package  
 - private method member inaccessible from other classes even within the same package

Access is restricted to within the class

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- + 10) Explain concept of "packs"-private" or  
"default" access. How does it affect  
the visibility of class members?  
= limits visibility to classes within the  
same package or is default if no  
access modifier is specified