Core Java Interview Questions:

# JAVA Interview questions:

What is difference between JRE, JDK and JVM?

JRE

JDK

* a software development environment used for developing Java applications and applets

JVM

* A specification where the working of Java Virtual Machine is specified. But implementation provider is independent to choose the algorithm. Its implementation has been provided by Sun and other companies.
* An implementation is a computer program that meets the requirements of the JVM specification.
* Runtime Instance Whenever you write a java command on the command prompt to run the java class, an instance of JVM is created.

What is the Entry-point in JAVA program?

* Java main method is the entry point of any java program. Its syntax is always public static void main(String[] args). You can only change the name of String array argument, for example you can change args to myStringArgs. Also String array argument can be written as String... args or String args[].

What does static keyword mean in JAVA?

* The static keyword is a non-access modifier used for methods and attributes. Static methods/attributes can be accessed without creating an object of a class.

What is Object and Class in JAVA?

* Java Classes and Objects are one of the core building blocks of Java applications, frameworks and APIs (Application Programming Interfaces).
* A class is a non-primitive or user-defined ***data type in Java***, while an object is an instance of a class. A class is a basis upon which the entire Java is built because class defines the nature of an object.

What are Immutable objects in JAVA?

* An object is considered *immutable* if its state cannot change after it is constructed. Maximum reliance on immutable objects is widely accepted as a sound strategy for creating simple, reliable code.
* Immutable objects are particularly useful in concurrent applications.

What is this keyword in JAVA?

The this keyword refers to the current object in a method or constructor.

The most common use of the this keyword is to eliminate the confusion between class attributes and parameters with the same name (because a class attribute is shadowed by a method or constructor parameter).

What is Constructor in JAVA?

A constructor in Java is a **special method** that is used to initialize objects. The constructor is called when an object of a class is created. It can be used to set initial values for object attributes:

What is private constructor?

* A private constructor is a special instance constructor. It is generally used in classes that contain static members only. If a class has one or more private constructors and no public constructors, other classes (except nested classes) cannot create instances of this class

Can you inherit constructor from another class?

* No, constructors cannot be inherited in Java.
* In inheritance sub class inherits the members of a super class except constructors.
* In other words, constructors cannot be inherited in Java therefore, there is no need to write final before constructors.

What are different OOPS Concepts?

* Object-oriented programming has four basic concepts: encapsulation, abstraction, inheritance and polymorphism. While these concepts may seem complex, understanding the general framework of how they work will help you understand the basics of an OOP computer program.

What are different access modifiers in JAVA?

* **There are four access modifiers:** public, private, protected and default (no keyword).

How to you achieve inheritance?

* The keyword used for inheritance is **extends**.

How do you refer to parent class objects in JAVA?

* The parent class can hold reference to both the parent and child objects. If a parent class variable holds reference of the child class, and the value is present in both the classes, in general, the reference belongs to the parent class variable. This is due to the run-time polymorphism characteristic in Java.

What class is superclass of all classes in JAVA?

* **Java.lang.Object**class is the root or superclass of the class hierarchy, which is present in **java.lang package**. All predefined classes and user-defined classes are the subclasses from **Object**class.

Is multiple inheritance supported in JAVA?

* The Java programming language supports multiple inheritance of type, which is the ability of a class to implement more than one interface. An object can have multiple types: the type of its own class and the types of all the interfaces that the class implements. This means that if a variable is declared to be the type of an interface, then its value can reference any object that is instantiated from any class that implements the interface. This is discussed in the section [Using an Interface as a Type](https://docs.oracle.com/javase/tutorial/java/IandI/interfaceAsType.html).

Why it's not supported? How can you achieve multiple inheritance in JAVA?

* The reason behind this is to prevent ambiguity.
* Consider a case where class B extends class A and Class C and both class A and C have the same method display().
* Now java compiler cannot decide, which display method it should inherit. To prevent such situation, multiple inheritances is not allowed in java.

How to you achieve Encapsulation?

* Encapsulation can be achieved by Declaring all the variables in the class as private and writing public methods in the class to set and get the values of variables.
* It is more defined with the setter and getter method.

What is Polymorphism?

What is difference between Overriding and OverLoading?

* Overriding implements Runtime Polymorphism whereas Overloading implements Compile time polymorphism.
* The method Overriding occurs between superclass and subclass. Overloading occurs between the methods in the same class.
* Overriding methods have the same signature i.e. same name and method arguments.

Can we overload a constructor?

Can we override static methods in JAVA? What happens if you do? Runtime or compile time error?

Can we override private methods in JAVA?

* Yes! Java supports constructor overloading. In constructor loading, we create multiple constructors with the same name but with different parameters types or with different no of parameters.

What is Abstraction?

Data **abstraction** is the process of hiding certain details and showing only essential information to the user.  
Abstraction can be achieved with either **abstract classes** or [**interfaces**](https://www.w3schools.com/java/java_interface.asp) (which you will learn more about in the next chapter).

The abstract keyword is a non-access modifier, used for classes and methods:

* **Abstract class:** is a restricted class that cannot be used to create objects (to access it, it must be inherited from another class).

* **Abstract method:** can only be used in an abstract class, and it does not have a body. The body is provided by the subclass (inherited from).

Can you make an object out of an Abstract class? How?

* We cannot create objects of an abstract class.
* To implement features of an abstract class, we inherit subclasses from it and create objects of the subclass.
* A subclass must override all abstract methods of an abstract class.

Can there be an abstract method without an abstract class?

* *you can declare****abstract****class without defining an abstract method in it. Once you declare a class****abstract****it indicates that the class is incomplete and, you cannot instantiate it.*

What are interfaces in JAVA?

* An interface is a completely "**abstract class**" that is used to group related methods with empty bodies:

How do you create an interface?

* To declare a class that implements an interface, you include an implements clause in the class declaration. Your class can implement more than one interface, so the implements keyword is followed by a comma-separated list of the interfaces implemented by the class. By convention, the implements clause follows the extends clause, if there is one.

What is aggregation in JAVA?

* *Aggregation*in Javais a relationship between two classes that is best described as a "has-a" and "whole/part" relationship. It is a more specialized version of the [association relationship](https://www.thoughtco.com/association-2034002). The aggregate class contains a reference to another class and is said to have ownership of that class.

What is Composition in JAVA?

* A **composition in Java** between two objects associated with each other exists when there is a strong relationship between one class and another. Other classes cannot exist without the owner or parent class. For example, A ‘Human’ class is a composition of Heart and lungs

Difference between aggregation and composition in JAVA?

* https://www.scaler.com/topics/association-composition-and-aggregation-in-java/

What is exception handling in JAVA?

* Java Exception Handling is a mechanism to handle runtime errors such as ClassNotFoundException, IOException, SQLException, RemoteException, etc.
* **Exception** is an unwanted or unexpected event, which occurs during the execution of a program, i.e. at run time, that disrupts the normal flow of the program’s instructions.

What is difference between checked and unchecked exception?

* A checked exception must be handled either by re-throwing or with a try catch block, a runtime isn’t required to be handled. An unchecked exception is a programming error and are fatal, whereas a checked exception is an exception condition within your codes logic and can be recovered or retried from.

Give me example of some exception that you have faced?

What is difference between throw and throws in exception?

* The throws keyword is used to declare which exceptions can be thrown from a method, while the throw keyword is used to explicitly throw an exception within a method or block of code.
* The throws keyword is used in a method signature and declares which exceptions can be thrown from a method.

What is difference between final, finally and finalize?

Can we have more than one catch in try-catch statement?

Can we have more than one finally in try-catch statement?

* You can only have one finally clause *per try/catch/finally statement*, but you can have multiple such statements, either in the same method or in multiple methods.
* Basically, a try/catch/finally statement is:
* try
* catch (0 or more)
* finally (0 or 1)

Can we have finally block without catch block?

* [Finally Block](https://java2blog.com/can-we-have-try-without-catch-block-in-java/#:~:text=Yes%2C%20we%20can%20have%20try,except%20in%20case%20of%20System.)

What happens if you use a return statement or a system.exit(0) call in a try block, does the

finally block get executed?

* Yes, the finally block will be executed even after a return statement in a method.
* The **finally block** will always execute even an exception occurred or not in Java.

Is it possible to create custom exceptions? how do you do it?

Steps to create a Custom Exception with an [Example](https://www.tutorialspoint.com/how-can-we-create-a-custom-exception-in-java)

* CustomException class is the custom exception class this class is extending Exception class.
* Create one local variable message to store the exception message locally in the class object.
* We are passing a string argument to the constructor of the custom exception object. The constructor set the argument string to the private string message.
* toString() method is used to print out the exception message.
* We are simply throwing a CustomException using one try-catch block in the main method and observe how the string is passed while creating a custom exception. Inside the catch block, we are printing out the message.

What are collections in JAVA?

* The **Collection in Java** is a framework that provides an architecture to store and manipulate the group of objects.
* Java Collections can achieve all the operations that you perform on a data such as searching, sorting, insertion, manipulation, and deletion.

What is difference between ArrayList and LinkedList?

* https://www.javatpoint.com/difference-between-arraylist-and-linkedlist

Difference between TreeSet and TreeMap?

* TreeMap is used to keep mappings between key and values in sorted order while TreeSet is used to keep just one element in sorted order. TreeSet also doesn't allow duplicates but TreeMap does allow duplicate values.

Difference between stack and heap?

* The **major difference between Stack memory and heap memory** is that the stack is used to store the order of method execution and local variables while the heap memory stores the objects and it uses dynamic memory allocation and deallocation.

What is stack memory and heap memory? Are they allocated by each thread or JVM instance?

* **Stack Memory in Java is used for static memory allocation and the execution of a thread.** It contains primitive values that are specific to a method and references to objects referred from the method that are in a heap.

Access to this memory is in Last-In-First-Out (LIFO) order.

* Prerequisites – [FIFO (First-In-First-Out) approach in Programming](https://www.geeksforgeeks.org/fifo-first-in-first-out-approach-in-programming/), [FIFO vs LIFO approach in Programming](https://www.geeksforgeeks.org/fifo-vs-lifo-approach-in-programming/)   
  **LIFO** is an abbreviation for **last in, first out**. It is a method for handling data structures where the **first element** is processed last and the **last element** is processed first.
* [Reference](https://www.geeksforgeeks.org/lifo-last-in-first-out-approach-in-programming/)

What is HashSet? vs TreeSet?

* A TreeSet is a set where the elements are sorted.
* A HashSet is a set where the elements are not sorted or ordered. It is faster than a TreeSet. The HashSet is an implementation of a Set.

What is HashMap? vs LinkedHashMap?

* The main difference between HashMap and LinkedHashMap is that LinkedHashMap maintains the insertion order of keys, the order in which keys are inserted into LinkedHashMap. On the other hand, HashMap doesn't maintain any order or keys, or values.

What is Concurrency in JAVA?

* https://www.vogella.com/tutorials/JavaConcurrency/article.html

What is Thread is JAVA?

* A *thread* is a thread of execution in a program. The Java Virtual Machine allows an application to have multiple threads of execution running concurrently.
* Every thread has a priority. Threads with higher priority are executed in preference to threads with lower priority.

How do you start a Thread in JAVA?

* https://jenkov.com/tutorials/java-concurrency/creating-and-starting-threads.html

What is Runnable interface in JAVA?

* A **runnable interface in**[**Java**](https://www.upgrad.com/blog/java-project-ideas-topics-for-beginners/) is an interface whose instances can run as a Thread. While working with Threads, the runnable interface acts as a core element of the Java [programming language](https://www.upgrad.com/blog/top-programming-languages-to-learn/). Java classes created to run Threads must implement this interface.

how do you prevent deadlock in threads?

How To Avoid Deadlock

* **Avoid Nested Locks**: A deadlock mainly happens when we give locks to multiple threads. Avoid giving a lock to multiple threads if we already have given to one.
* **Avoid Unnecessary Locks**: We can have a lock only those members which are required. Having a lock unnecessarily can lead to a deadlock.
* **Using Thread.join():** A deadlock condition appears when one thread is waiting other to finish. If this condition occurs we can use **Thread.join()** with the maximum time the execution will take.

What is difference between a feature and Story?

* A feature is what everyone else refers to as an epic,
* A user story is a type of story
* Epics can be broken down into capabilities which can be broken down into features which can be broken down into user stories.

What are JAVA Reflections API?

**Java Reflection** is a *process of examining or modifying the run time behavior of a class at run time*.

How to dynamically load classes in JAVA?

[Example](https://examples.javacodegeeks.com/core-java/dynamic-class-loading-example/)

How do you convert JSON object to Java object?

* A **Gson**is a json library for java, which is created by **Google**and it can be used to generate a JSON. By using Gson, we can generate JSON and convert JSON to java objects. We can call the **fromJson()**method of **Gson**class to convert a **JSON object to Java Object.**

How will you convert character array into string?

* https://www.educative.io/answers/converting-a-character-array-to-a-string-in-java

What is the contract between hashcode() and equals() in Java?

General contract associated with hashCode() method

* The**hashCode()** method should return the same integer value for the same object for each calling of this method unless the value stored in the object is modified.
* If two objects are equal(according to **equals()** method) then the **hashCode()** method should return the same integer value for both the objects.
* But, it is not necessary that the**hashCode()** method will return the distinct result for the objects that are not equal (according to **equals()** method).