PW SKILLS

JAVA With DSA & System Design

Assignment – Static Keyword in Java

Day - 18

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1. **Why do we need static keyword in Java? Explain with an example?**
   Ans: Static keywords have only one value which is used by all the objects in the class.
   - We don't need to create an object when we are using a static variable or method in another static method, we can directly use it**.**
   - To make the variable or method as a class member. It means the static provides you to call a variable or method just by the class name.
   - Use the static variable for the property that is common to all objects.
2. **What is class loading and how does the java program actually execute?**
   Ans: **Classloading** is done by ClassLoaders in Java which can be implemented to eagerly load a class as soon as another class references it or lazy load the class until a need for class initialization occurs.
   The execution of class loading process in Java is divided into three phases:
   a. **Loading:** In the loading phase, the classloader locates the class file using the fully qualified class name, reads the class file, and converts it into a Class object. The Class object contains the metadata of the class, such as the fields, methods, and constructors
   b. **Linking:** In the linking phase, the JVM performs several operations on the Class object, such as verifying the class file's integrity, resolving symbolic references, and allocating memory for the class variables.
   c. **Initialization**: In the initialization phase, the JVM initializes the class variables with their default's values, and runs the class's static initialization block.

3. **Can we mark a local variable as static?**
   Ans: No, In Java, a static variable is a class variable (for the whole class). So, if we have a static local variable (a variable with scope limited to function), it violates the purpose of static. Hence the compiler does not allow static local variables.
4. **Why is the static block executed before the main method in java?**
   Ans: Static block in java initializes when class loads into memory, it means when JVM reads the byte code. Initialization can be anything; it can be variable initialization or anything else which should be shared by all objects of that class. In other words we can say, in the background java command executes the main thread as classname.main() which is similar to static method calling. So statements in the static block execute first than the main method.
5. **Why is a static method also called a class method?**
   Ans: In Java, a static method is a method that belongs to a class rather than an instance of a class. The method is accessible to every instance of a class, but methods defined in an instance are only able to be accessed by that object of a class.

   A static method is not part of the objects it creates but is part of a class definition. Unlike instance methods, a static method is referenced by the class name and can be invoked without creating an object of class.
6. **What is the use of static blocks in java?**
   Ans: Uses of Static blocks in Java:

- A static initialization block is mostly used for changing the default value of static variables.
- It can be used to initialize any static fields which are too complicated to be set up with a one-line declaration.
- It can be used to set up static resources in other ways, such as making sure other classes have been loaded or reading in properties files associated with the class.

7. Difference between Static and Instance variables?

Ans: Static and Instance variables:

S.R.	Static Variables	Instance Variables
1.	Class variables also known as static variables are declared with the static keyword in a class, but outside a method, constructor or a block.	Instance variables are declared in a class, but outside a method, constructor or any block.
2.	Static Variables are declared using the keyword 'static'.	Instance Variables are declared without using the keyword 'static'.
3.	All objects of a class share the same copy of static variables.	Each object of the class gets its own copy of instance variables.
4.	Static Variables can be accessed using the class name or object.	Instance Variables can be accessed only through an object of the class.
5.	A static variable is a property of a class.	An instance variable is a property of an instance.
6.	A static variable is created only once when the classloader loads the class.	An instance variable is created every time an instance is created.
7.	A static variable is used when you want to store a value that represents all the instances like count, sum, average etc.	An instance variable is used to store a value that represents property of a single instance.

8. Difference between Static and Non-Static members

Ans: Static and Non-static members:

S.R.	Static Members	Instance Members
1.	They are declared using the keyword 'static'.	They are declared without using the keyword 'static'.

2.	All objects of a class share the same copy of Static data members.	Each object of the class gets its own copy of non-Static data members.
3.	They can be accessed using the class name or object.	They can be accessed only through an object of the class.
4.	static members are one per class	non-static members are one per instance.
5.	static members are accessed by their class name which encapsulates them,	non-static members are accessed by object reference.
6.	static members can't use non-static methods without instantiating an object,	non-static members can use static members directly.
8.	static constructor is used to initialize static fields,	for non-static fields a normal instance constructor is used.