Static Keyword & JVM Architecture

Day 18 Assignment

1. Why do we need static keywords in Java Explain with an example?
2. What is class loading and how does the Java program actually executes?
3. Can we mark a local variable as static
4. Why is the static block executed before the main method in java?
5. Why is a static method also called a class method?
6. What is the use of static blocks in java?
7. Difference between Static and Instance variables
8. Difference between static and non static members

1. Why do we need static keywords in Java Explain with an example?

Ans: Need of static keywords are following

- To create a static member(block, variable, method, nested class), precede its declaration with the keyword static.
- The static keyword is a non-access modifier in Java that is applicable for the following:
    a. Blocks
    b. Variables
    c. Methods
    d. Classes

Eg-

```
class Test
{
	// static variable
	static int a = m1();
	// static block
	static {
		System.out.println("Inside static block");
	}
	// static method
	static int m1() {
		System.out.println("from m1");
		return 20;
	}
	// static method(main !!)
	public static void main(String[] args)
	{
	System.out.println("Value of a : "+a);
	System.out.println("from main");
	}
}
```

Output

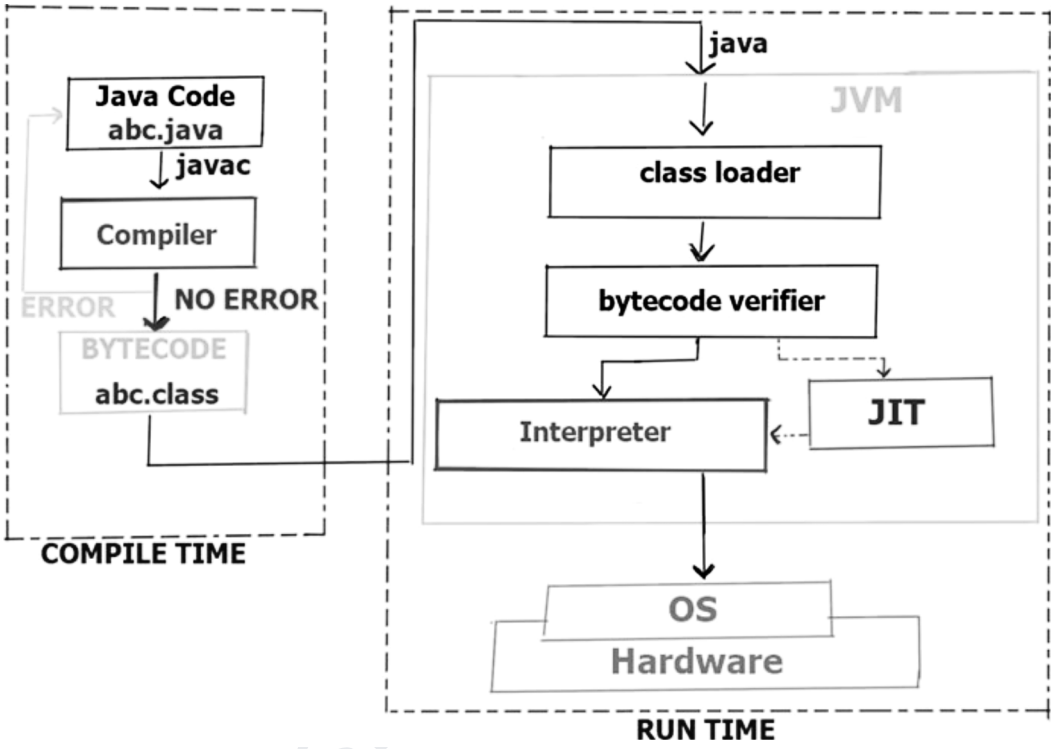
```
from m1
Inside static block
```

Value of a : 20
from main

2. What is class loading and how does the Java program actually executes?

Ans: Loading means **obtaining the byte array representing the Java class file**.

- **Class loaders are responsible for loading Java classes dynamically to the JVM (Java Virtual Machine) during runtime**. They're also part of the JRE (Java Runtime Environment). Therefore, the JVM doesn't need to know about the underlying files or file systems in order to run Java programs thanks to class loaders.
- Now, Let us see how java program can be executed



3. Can we mark a local variable as static

Ans: 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 local variables as static.

4. Why is the static block executed before the main method in java?

Ans: The static blocks always execute first before the main() method in Java **because the compiler stores them in memory at the time of class loading and before the object creation**.

5. Why is a static method also called a class method?

Ans: A static method in Java is **a method that is part of a class rather than an instance of that class**. Every instance of a class has access to the method. Static methods have access to class variables (static variables) without using the class's object (instance). Only static data may be accessed by a static method. so, because of this reason, the static method is also called a class method.

6. What is the use of static blocks in java?

Ans: Static block in java is used for **changing the default value of static variables, initializing static variables of the class, writing a set of codes that you want to execute during the class loading in memory**.

7. Difference between Static and Instance variables

Ans:

Static/Class Variable	Instance Variable
Static Variables are declared using the keyword 'static'.	Instance Variables are declared without using the keyword 'static'.
All objects of a class share the same copy of static variables.	Each object of the class gets its own copy of instance variables.
Static Variables can be accessed using the class name or object.	Instance Variables can be accessed only through an object of the class.

8. Difference between static and non static members

Ans:

Sr. No	Instance Data members	Static (class) Data members
1	Memory will be allocated each and every time whenever an object is created	Memory will be allocated only once, whenever the class is loaded in the main memory regardless of number of objects created
2	Instance variable Stores specific values	Class variable Stores common values
3	Instance variable declaration never preceded by a keyword static **Syntax:** int Stud_1, Stud_2 ..... Stud_n;	Class type variable declaration always preceded by **static** keyword. **Syntax:** static int Stud_1, Stud_2 ..... Stud_n;
4	These variables must be accessed with object name. **Example:** ObjectName.Stud_1;	These variables must be accessed with class name. **Example:** ClassName.Stud_1;
5	They are also known as Object Level Data Members	They are also known as Class Level Data Members