3. STATIC VARIABLES, METHODS AND BLOCKS

1. Static variables:

The variables which are used in common in all instanzes are created as static So that all instances can share single copy. If any instance changes the value of static variable, it will get affected for all other instances. The static variables get first loaded in to the memory at the time of class loading. There are several properties of static variable.

- These are class variables.
- These declared with static keyword inside class.
- The static variables are loaded statically in static context along with the class at the time of class loading. Thus here is static memory allocation.
- These have only one time memory allocation
- The static variables are accessed using classname. No need to use object of that class.

Example:

College Name for all students working in same college is always same then variable college name will be static. And variable student name will be instance variable.

```
public  static String collegeName="Terna College of Engineering";
```

The static variables can be made constant. Then its single copy will remain unchanged.

```
public  static final String collegeName="Terna College of Engineering";
```

Note: We can not make local variable as static as local variable has only a local scope and the static keyword is used to give class level scope.

Difference Between Nonstatic and Static Variable:

Nonstatic Variable	Static variable
Own copy for every instance	Single and Shared copy among instances
Declared without using static keyword	Declared with using static keyword
Instance variable	Class variable
Loaded dynamically in heap when new object get created	Loaded statically in static context along with class at the time of class loading before the execution starts
Memory will get allocated every time when new instance will get created	Memory allocation is only once. Thus it saves the memory
Accessed using object of that class	Accessed using classname of that class
Can be refered using this or super	Can not be refered using this or super as it is a class variable
Example: In a particular college, there will be	Example: In a particular college, college name

severals students having different names.	will be common to all students. Thus all can share the same college name.
Example: String stdname;	Example: static String collname=”Sanjay Ghodawat Institutes”;

2. Static methods:

Generally static methods are used to define some common behaviour for all the instances. The static methods are known as class methods. These methods are defined with static keywords. The instance methods have different behaviour for different objects but static method has common behaviour for all objects. The static methods also get loaded first in memory known as static context at the time of class loading. Thats why main is declared as static so it should get loaded fist in memory to start the execution. There are several properties of static methods

- It is shared among instances
- It has only single copy
- It is loaded when class gets loaded
- It has only one time memory allocation

Syntax:

```
public static void setRules() {
 // common behaviour for all instances
}
```

For example: There are certain rules of college that are common to all the students. Thus all students can follow the same rules which are defined by the college. In between the college can set the new rules then students will access the updated rules.

Note: Static methods can be accessed using its class name. No need to use object of that class to call it. Static methods can be overloaded. But static methods can not be overriden. If you define the same static method name with type signatures in subclass same as super class, then one of the method will get over hidden.

Difference Between Nonstatic and Static Method:

Nonstatic method	Static method
It has own copy for every instance	It has single and Shared copy among instances
It is nstance method	It is class method
It is loaded dynamically when new object get created	It is loaded statically along with class
It is accessed using object of that class	It is accessed using class name of that class
The memory will get allocated every time when new instance will get created	The memory allocation is only once
It can access static variable and instance	It can access only static variables directly.

variables directly.	
It can call static methods and instance methods directly	It can call only other static methods directly
It can use this and super keyword	It can not use this and super keyword
It can be called using this or super keyword	It can not be called using this or super keyword

Note: To access normal instance method from static method, static method must know instance of that class. Main method is defined as static because program excecution starts from main. JVM should call that method at first without using any object. And it should be loaded in memory at once.

3. Static blocks:

- Is used to initialize the static data member.
- It is executed before main method at the time of classloading.
- This get executed only once.

Example:

```
class StaticBlockDemo
{
        static {
                System.out.println("static block is invoked");
        }
        public static void main(String args[]) {
                System.out.println("Hello main");
        }
}
```

Output:

```
static block is invoked
Hello main
```

Note : In the previous version of java, it was allowed to execute the code without main method by creating just static block in program. But from JDK 1.7 we can not execute the code without main method.

Assignments of this chapter are given in previous chapter (Chapter 2).