static keyword in java

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static is a non-access modifier in Java which is applicable for the following:

1. blocks
2. variables
3. methods
4. nested classes

To create a static member(block,variable,method,nested class), precede its declaration with the keyword *static*. When a member is declared static, it can be accessed before any objects of its class are created, and without reference to any object. For example, in below java program, we are accessing static method *m1()* without creating any object of *Test* class.

```java
// Java program to demonstrate that a static member
// can be accessed before instantiating a class
class Test
{
    // static method
    static void m1()
    {
        System.out.println("from m1");
    }

    public static void main(String[] args)
    {
          // calling m1 without creating
          // any object of class Test
           m1();
    }
}
```

Output:

```
from m1
```

Static blocks

If you need to do computation in order to initialize your **static variables**, you can declare a static block that gets executed exactly once, when the class is first loaded. Consider the following java program demonstrating use of static blocks.

```
// Java program to demonstrate use of static blocks
class Test
{
    // static variable
    static int a = 10;
    static int b;

    // static block
    static {
        System.out.println("Static block initialized.");
        b = a * 4;
    }

    public static void main(String[] args)
    {
       System.out.println("from main");
       System.out.println("Value of a : "+a);
       System.out.println("Value of b : "+b);
    }
}
```

Output:

```
Static block initialized.
from main
Value of a : 10
Value of b : 40
```

For Detailed article on static blocks, see static blocks

Static variables

When a variable is declared as static, then a single copy of variable is created and shared among all objects at class level. Static variables are, essentially, global variables. All instances of the class share the same static variable.

Important points for static variables :-

- We can create static variables at class-level only. See here
- static block and static variables are executed in order they are present in a program.

Below is the java program to demonstrate that static block and static variables are executed in order they are present in a program.

```
// java program to demonstrate execution
// of static blocks and variables
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
```

Static methods

When a method is declared with *static* keyword, it is known as static method. The most common example of a static method is *main( )* method.As discussed above, Any static member can be accessed before any objects of its class are created, and without reference to any object.Methods declared as static have several restrictions:

- They can only directly call other static methods.
- They can only directly access static data.
- They cannot refer to this or super in any way.

Below is the java program to demonstrate restrictions on static methods.

```
// java program to demonstrate restriction on static methods
class Test
{
    // static variable
    static int a = 10;

    // instance variable
    int b = 20;

    // static method
    static void m1()
    {
        a = 20;
        System.out.println("from m1");

         // Cannot make a static reference to the non-static field b
         b = 10; // compilation error

         // Cannot make a static reference to the
                 // non-static method m2() from the type Test
         m2();  // compilation error
         //  Cannot use super in a static context
         System.out.println(super.a); // compiler error
    }

    // instance method
    void m2()
    {
        System.out.println("from m2");
    }



    public static void main(String[] args)
    {
        // main method
    }
}
```

When to use static variables and methods?

Use the static variable for the property that is common to all objects. For example, in class Student, all students shares the same college name. Use static methods for changing static variables.

Consider the following java program, that illustrate the use of *static* keyword with variables and methods.

```
// A java program to demonstrate use of
// static keyword with methods and variables

// Student class
class Student
{
    String name;
    int rollNo;

    // static variable
    static String cllgName;

    // static counter to set unique roll no
    static int counter = 0;


    public Student(String name)
    {
        this.name = name;
        this.rollNo = setRollNo();
    }

    // getting unique rollNo
    // through static variable(counter)
    static int setRollNo()
    {
        counter++;
        return counter;
    }

    // static method
    static void setCllg(String name){
        cllgName = name ;
    }

    // instance method
    void getStudentInfo(){
        System.out.println("name : " + this.name);
        System.out.println("rollNo : " + this.rollNo);

        // accessing static variable
        System.out.println("cllgName : " + cllgName);
    }
}

//Driver class
public class StaticDemo
{
    public static void main(String[] args)
    {
        // calling static method
        // without instantiating Student class
        Student.setCllg("XYZ");

        Student s1 = new Student("Alice");
        Student s2 = new Student("Bob");

        s1.getStudentInfo();
        s2.getStudentInfo();

    }
}
```

Output:

```
name : Alice
rollNo : 1
```

```
cllgName : XYZ
```

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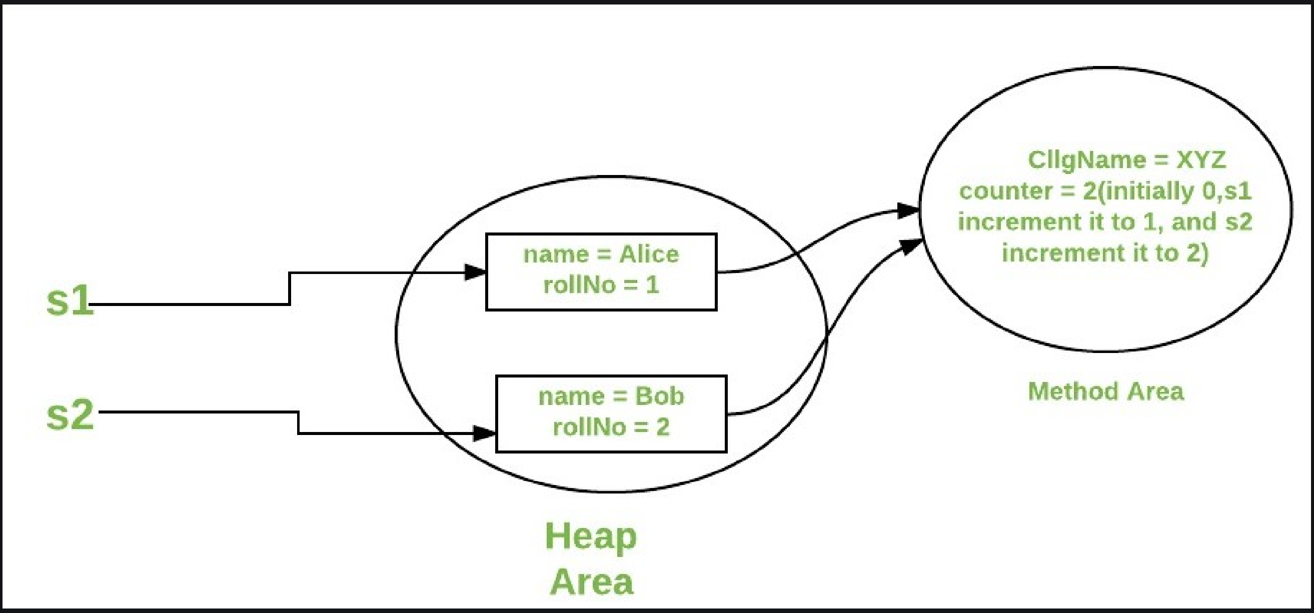

Static nested classes : We can not declare top-level class with a static modifier, but can declare nested classes as static. Such type of classes are called Nested static classes. For static nested class, see static nested class in java

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