Static keyword

The **static keyword** in [Java](https://www.javatpoint.com/java-tutorial) is used for memory management mainly. We can apply static keyword with [variables](https://www.javatpoint.com/java-variables), methods, blocks and [nested classes](https://www.javatpoint.com/java-inner-class). The static keyword belongs to the class than an instance of the class.

The static can be:

1. Variable (also known as a class variable)
2. Method (also known as a class method)
3. Block
4. Nested class

Java static variable

If you declare any variable as static, it is known as a static variable.

* The static variable can be used to refer to the common property of all objects (which is not unique for each object), for example, the company name of employees, college name of students, etc.
* The static variable gets memory only once in the class area at the time of class loading.

Advantages of static variable

It makes your program **memory efficient** (i.e., it saves memory).

Understanding the problem without static variable

1. **class** Student{
2. **int** rollno;
3. String name;
4. String college="STCET";
5. }

Suppose there are 500 students in my college, now all instance data members will get memory each time when the object is created. All students have its unique rollno and name, so instance data member is good in such case. Here, "college" refers to the common property of all [objects](https://www.javatpoint.com/object-and-class-in-java). If we make it static, this field will get the memory only once.

Java static property is shared to all objects.

Example of static variable

1. //Java Program to demonstrate the use of static variable
2. **class** Student{
3. **int** rollno;//instance variable
4. String name;
5. **static** String college ="ITS";//static variable
6. //constructor
7. Student(**int** r, String n){
8. rollno = r;
9. name = n;
10. }
11. //method to display the values
12. **void** display (){System.out.println(rollno+" "+name+" "+college);}
13. }
14. //Test class to show the values of objects
15. **public** **class** TestStaticVariable1{
16. **public** **static** **void** main(String args[]){
17. Student s1 = **new** Student(111,"Karan");
18. Student s2 = **new** Student(222,"Aryan");
19. //we can change the college of all objects by the single line of code
20. //Student.college="BBDIT";
21. s1.display();
22. s2.display();
23. }
24. }

**Since these methods and variables cannot be stored in a normal heap, they are stored in a special area called permanent generation(PermGen).**

***The main difference is that the heap is the auto growing space, with RAM memory as its constraints, whereas this PermGen has a fixed space allocation, and this is shared with all the instances.***

Program of the counter without static variable

In this example, we have created an instance variable named count which is incremented in the constructor. Since instance variable gets the memory at the time of object creation, each object will have the copy of the instance variable. If it is incremented, it won't reflect other objects. So each object will have the value 1 in the count variable.

1. //Java Program to demonstrate the use of an instance variable
2. //which get memory each time when we create an object of the class.
3. class Counter{
4. int count=0;//will get memory each time when the instance is created
6. Counter(){
7. count++;//incrementing value
8. System.out.println(count);
9. }
11. public static void main(String args[]){
12. //Creating objects
13. Counter c1=new Counter();
14. Counter c2=new Counter();
15. Counter c3=new Counter();
16. }
17. ***}***

Program of counter by static variable

As we have mentioned above, static variable will get the memory only once, if any object changes the value of the static variable, it will retain its value.

1. //Java Program to illustrate the use of static variable which
2. //is shared with all objects.
3. **class** Counter2{
4. **static** **int** count=0;//will get memory only once and retain its value
6. Counter2(){
7. count++;//incrementing the value of static variable
8. System.out.println(count);
9. }
11. **public** **static** **void** main(String args[]){
12. //creating objects
13. Counter2 c1=**new** Counter2();
14. Counter2 c2=**new** Counter2();
15. Counter2 c3=**new** Counter2();
16. }
17. }

2) Java static method

If you apply static keyword with any method, it is known as static method.

* A static method belongs to the class rather than the object of a class.
* A static method can be invoked without the need for creating an instance of a class.
* A static method can access static data member and can change the value of it.

**Example of static method**

1. //Java Program to demonstrate the use of a static method.
2. **class** Student{
3. **int** rollno;
4. String name;
5. **static** String college = "STCET";
6. //static method to change the value of static variable
7. **static** **void** change(){
8. college = "MCKV";
9. }
10. //constructor to initialize the variable
11. Student(**int** r, String n){
12. rollno = r;
13. name = n;
14. }
15. //method to display values
16. **void** display(){System.out.println(rollno+" "+name+" "+college);}
17. }
18. //Test class to create and display the values of object
19. **public** **class** TestStaticMethod{
20. **public** **static** **void** main(String args[]){
21. Student.change();//calling change method
22. //creating objects
23. Student s1 = **new** Student(111,"Karan");
24. Student s2 = **new** Student(222,"Aryan");
25. Student s3 = **new** Student(333,"Sonoo");
26. //calling display method
27. s1.display();
28. s2.display();
29. s3.display();
30. }
31. }

**Another example of a static method that performs a normal calculation**

1. //Java Program to get the cube of a given number using the static method
3. **class** Calculate{
4. **static** **int** cube(**int** x){
5. **return** x\*x\*x;
6. }
8. **public** **static** **void** main(String args[]){
9. **int** result=Calculate.cube(5);
10. System.out.println(result);
11. }
12. }

**Car myCar1 = new Car("blue");**

**//Car myCar2 = myCar1;**

**Car myCar3 = new Car("blue")**

**Cal ob1=new.cal(2);**

**Ob1.demo();**

**class** A2{

**static**{

System.out.println("static block is invoked");

}

**public** **static** **void** main(String args[]){

   System.out.println("Hello main");

  }

}

**Can a static block exist without a main() method? Yes as well no**

### ****Can we****[Overload](https://javainterviewpoint.com/java-method-overloading-example/)****static methods in Java? yes****

### ****//Can we****[Override](https://javainterviewpoint.com/what-is-method-overriding-in-java/)****static methods in Java? No****

### ****Why main() method is declared as static?****

### Can we have multiple static blocks in our code?

### Can constructors be static in Java?

### //Why [abstract method](https://javainterviewpoint.com/abstract-class-java/) cannot be static in Java?

### //Can [Interface in Java](https://javainterviewpoint.com/interface-java/) have static methods in it ?

### //Can abstract class have static variable in it ?

### non-static method cannot be referenced from a static context ?

### class Test

### {

### Main ()

### {

### M();

### }

### M()

### {

### Sop(hdfhgshe);

### }