ENCAPSULATION IN JAVA

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Encapsulation in java

Encapsulation:

The binding of data into single entity is called as encapsulation.

In other words, encapsulation is a programming technique that binds the class members (variables and methods) together and prevents them from being accessed by other classes.

Thereby, we can keep variables and methods safes from outside interference and misuse.

Example: Every Java class is an example of encapsulation because we write everything within the class only that binds variables and methods together and hides their complexity from other classes.

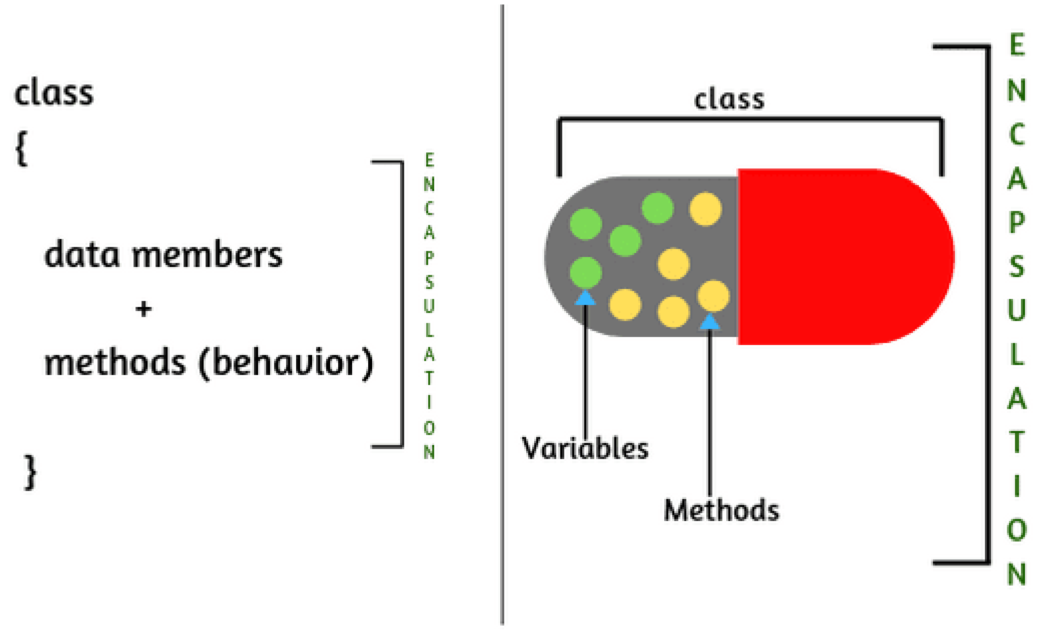

Fig: Encapsulation

Note: In encapsulation, the variables of a class will be hidden from other classes and can be accessed only through the members of their current class hence it is also called as data hiding.

Example :

```
 Class Employee{
int salary;
}
```

Why ?

```
Employee e1= new Employee();
e1.salary=5000;  //case 1


Employee e2= new Employee();
e2.salary=-3000;  //case 2
```

In this example, case 1, we are passing the 5000 salary to the employee that is correct but case 2, we are passing the salary -3000 that is the negative salary.

So salary cannot be negative.

That means if we allow direct access to the variables there is a possibility that we may provide wrong inputs to the program, which is not a good practice for developer.

How we are going to achieve this?   by using encapsulation-

```
class Employee {


private int salary;

      public void setSalary(int sal) {
            if (sal > 0) {
                  salary = sal;
            } else {
                  salary = 0;
            }
      }

      public int getSalary() {
            return salary;
      }

}
```

In this example, We achieved encapsulation by making our global variable as private and by providing public getter and setter method for that variable.

In the setter method we are checking the whether the salary is greater than zero. Because salary cannot be negative so in this way.

In encapsulation direct access to the variables is restricted and it can only be accessed through the setter method which will have checks implemented for correct initialization of global variables.

Program for Encapsulation-

```java
public class EncapsulationTest {

	public static void main(String[] args) {

		Employee employee= new Employee ();
		employee.setSalary(-5000);
		System.out.println("salary>>"+employee.getSalary());
	}
}
```

How to achieve or implement Encapsulation in Java

There are two important points whereby we can achieve or implement encapsulation in Java program.

1. Declaring the instance variable of the class as private. so that it cannot be accessed directly by anyone from outside the class.

2. Provide the public setter and getter methods in the class to set/modify the values of the variable/fields.

Advantage of Encapsulation in Java

There are following advantages of encapsulation in Java. They are as follows:

1. The encapsulated code is more flexible and easy to change with new requirements.

2. It prevents the other classes to access the private fields.

3. Encapsulation allows modifying implemented code without breaking other code that has implemented the code.

4. It keeps the data and codes safe from external inheritance. Thus, Encapsulation helps to achieve security.

5. It improves the maintainability of the application.

6. If you don’t define the setter method in the class then the fields can be made read-only.

7. If you don’t define the getter method in the class then the fields can be made write-only.

Disadvantage of Encapsulation in Java

The main disadvantage of encapsulation in Java is it increases the length of the code.

Realtime Example:

When you log into your email accounts such as Gmail, Yahoo Mail, or Rediff mail, there is a lot of internal processes taking place in the backend and you have no control over it.

When you enter the password for logging, they are retrieved in an encrypted form and verified, and then you are given access to your account.

You do not have control over it that how the password has been verified. Thus, it keeps our account safe from being misused.