**Encapsulation** is one of the four fundamental OOP concepts. The other three are inheritance, polymorphism, and abstraction.

Encapsulation in Java is a mechanism of wrapping the data (variables) and code acting on the data (methods) together as a single unit. In encapsulation, the variables of a class will be hidden from other classes, and can be accessed only through the methods of their current class. Therefore, it is also known as **data hiding**.

**To achieve encapsulation in Java −**

* Declare the variables of a class as private.
* Provide public setter and getter methods to modify and view the variables values.

**Encapsulation in Java** is a *process of wrapping code and data together into a single unit*, for example, a capsule which is mixed of several medicines.



We can create a fully encapsulated class in Java by making all the data members of the class private. Now we can use setter and getter methods to set and get the data in it.

The **Java Bean** class is the example of a fully encapsulated class.

**Advantage of Encapsulation in Java:**

By providing only a setter or getter method, you can make the class **read-only or write-only**. In other words, you can skip the getter or setter methods.

It provides you the **control over the data**. Suppose you want to set the value of id which should be greater than 100 only, you can write the logic inside the setter method. You can write the logic not to store the negative numbers in the setter methods.

It is a way to achieve **data hiding** in Java because other class will not be able to access the data through the private data members.

The encapsulate class is **easy to test**. So, it is better for unit testing.

The standard IDE's are providing the facility to generate the getters and setters. So, it is **easy and fast to create an encapsulated class** in Java.

**Example:**

Following is an example that demonstrates how to achieve Encapsulation in Java −

/\* File name : EncapTest.java \*/

public class EncapTest {

private String name;

private String idNum;

private int age;

public int getAge() {

return age;

}

public String getName() {

return name;

}

public String getIdNum() {

return idNum;

}

public void setAge( int newAge) {

age = newAge;

}

public void setName(String newName) {

name = newName;

}

public void setIdNum( String newId) {

idNum = newId;

}

}

The public setXXX() and getXXX() methods are the access points of the instance variables of the EncapTest class. Normally, these methods are referred as getters and setters. Therefore, any class that wants to access the variables should access them through these getters and setters.

The variables of the EncapTest class can be accessed using the following program −

/\* File name : RunEncap.java \*/

public class RunEncap {

public static void main(String args[]) {

EncapTest encap = new EncapTest();

encap.setName("James");

encap.setAge(20);

encap.setIdNum("12343ms");

System.out.print("Name : " + encap.getName() + " Age : " + encap.getAge());

}

}

This will produce the following result −

Output

Name : James Age : 20

## Benefits of Encapsulation:

* The fields of a class can be made read-only or write-only.
* A class can have total control over what is stored in its fields.