

# Java Encapsulation

## What is Encapsulation?

**Encapsulation means hiding the internal details of an object and only showing what is necessary.**

It is the technique of wrapping data (variables) and code (methods) together as a single unit, typically inside a class.

It is used to protect the data from outside interference and misuse.

## Why Use Encapsulation?

1. To hide the internal state of an object and only expose safe methods.
2. To control how data is accessed and modified.
3. To improve code maintainability, security, and reusability.
4. To support data hiding (which is a form of abstraction).

## How to Achieve Encapsulation in Java?

**#** Declare variables private.

**#** Provide public getter and setter methods to access and update private variables.



## Structure Example:



java

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```
public class Student {  
    private String name;  
    private int age;  
  
    // Getter for name  
    public String getName() {  
        return name;  
    }  
  
    // Setter for name  
    public void setName(String newName) {  
        name = newName;  
    }  
  
    // Getter for age  
    public int getAge() {  
        return age;  
    }  
  
    // Setter for age  
    public void setAge(int newAge) {  
        if (newAge >= 0) {  
            age = newAge;  
        }  
    }  
}
```

## Usage:

java

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```
public class Main {  
    public static void main(String[] args) {  
        Student s = new Student();  
        s.setName("Rakib");  
        s.setAge(20);  
  
        System.out.println("Name: " + s.getName());  
        System.out.println("Age: " + s.getAge());  
    }  
}
```

## Benefits of Encapsulation:

| <u>Benefit</u>        | <u>Description</u>                                   |
|-----------------------|--|
| Data Protection       | Prevents unauthorized access                         |
| Control over Data     | Can validate input via setters                       |
| Code Flexibility      | Change internal code without affecting other classes |
| Increased Reusability | Cleaner code is easier to reuse                      |



## **Real-Life Example:**

Think of a capsule or ATM machine.

You don't see how it works inside, but you interact with buttons (methods) to perform operations safely.



## **In Short:**

**Encapsulation means:**

- ✓ **Keep variables private**
- ✓ **Use public methods to get and set values**
- ✓ **Helps you write safe and clean code**