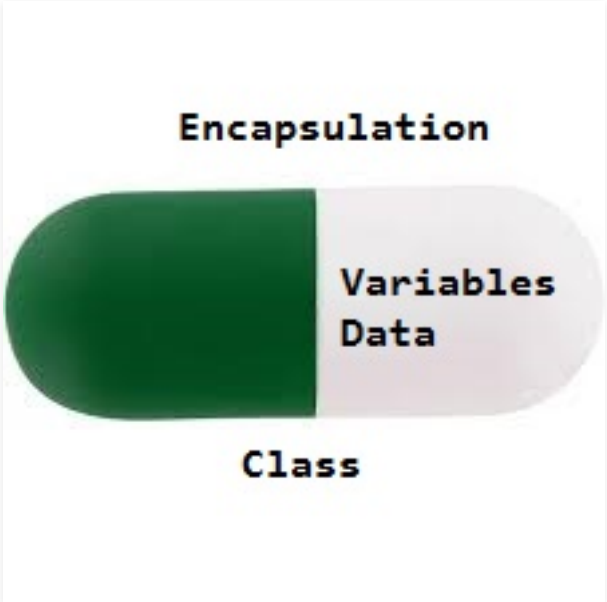
Encapsulation in Java

Difficulty Level : Easy Last Updated : 02 Aug, 2021

Encapsulation is defined as the wrapping up of data under a single unit. It is the mechanism that binds together code and the data it manipulates. Another way to think about encapsulation is, it is a protective shield that prevents the data from being accessed by the code outside this shield.

- Technically in encapsulation, the variables or data of a class is hidden from any other class and can be accessed only through any member function of its own class in which it is declared.
- As in encapsulation, the data in a class is hidden from other classes using the data hiding concept which is achieved by making the members or methods of a class private, and the class is exposed to the end-user or the world without providing any details behind implementation using the abstraction concept, so it is also known as a **combination of data-hiding and abstraction**.
- Encapsulation can be achieved by Declaring all the variables in the class as private and writing public methods in the class to set and get the values of variables



The program to access variables of the class EncapsulateDemo is shown below:

```java
// Java program to demonstrate encapsulation
class Encapsulate {
    // private variables declared
    // these can only be accessed by
    // public methods of class
    private String geekName;
    private int geekRoll;
    private int geekAge;

    // get method for age to access
    // private variable geekAge
    public int getAge() { return geekAge; }

    // get method for name to access
    // private variable geekName
    public String getName() { return geekName; }

    // get method for roll to access
    // private variable geekRoll
    public int getRoll() { return geekRoll; }

    // set method for age to access
    // private variable geekage
    public void setAge(int newAge) { geekAge = newAge; }

    // set method for name to access
    // private variable geekName
    public void setName(String newName)
    {
        geekName = newName;
    }

    // set method for roll to access
    // private variable geekRoll
    public void setRoll(int newRoll) { geekRoll = newRoll; }
}

public class TestEncapsulation {
    public static void main(String[] args)
    {
        Encapsulate obj = new Encapsulate();

        // setting values of the variables
        obj.setName("Harsh");
        obj.setAge(19);
        obj.setRoll(51);

        // Displaying values of the variables
        System.out.println("Geek's name: " + obj.getName());
        System.out.println("Geek's age: " + obj.getAge());
        System.out.println("Geek's roll: " + obj.getRoll());

        // Direct access of geekRoll is not possible
        // due to encapsulation
        // System.out.println("Geek's roll: " +
```

```
            // obj.geekName);
        }
    }
```

Output

```
Geek's name: Harsh
Geek's age: 19
Geek's roll: 51
```

In the above program, the class Encapsulate is encapsulated as the variables are declared as private. The get methods like getAge() , getName() , getRoll() are set as public, these methods are used to access these variables. The setter methods like setName(), setAge(), setRoll() are also declared as public and are used to set the values of the variables.

Advantages of Encapsulation:

- **Data Hiding:** The user will have no idea about the inner implementation of the class. It will not be visible to the user how the class is storing values in the variables. The user will only know that we are passing the values to a setter method and variables are getting initialized with that value.
- **Increased Flexibility:** We can make the variables of the class read-only or write-only depending on our requirement. If we wish to make the variables read-only then we have to omit the setter methods like setName(), setAge(), etc. from the above program or if we wish to make the variables as write-only then we have to omit the get methods like getName(), getAge(), etc. from the above program
- **Reusability:** Encapsulation also improves the re-usability and is easy to change with new requirements.
- **Testing code is easy:** Encapsulated code is easy to test for unit testing.

This article is contributed by **Harsh Agarwal**. If you like GeeksforGeeks and would like to contribute, you can also write an article using write.geeksforgeeks.org or mail your article to review-team@geeksforgeeks.org. See your article appearing on the GeeksforGeeks main page and help other Geeks.
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