**Encapsulation**

Encapsulation is one of the four fundamental OOP concepts. The other three are inheritance, polymorphism, and abstraction.Encapsulation in Java is a mechanism for 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.

**Abstraction**

Abstraction is the quality of dealing with ideas rather than events. For example, when you consider the case of e-mail, complex details such as what happens as soon as you send an e-mail, the protocol your e-mail server uses are hidden from the user. Therefore, to send an e-mail you just need to type the content, mention the address of the receiver, and click send.

Likewise in Object-oriented programming, abstraction is a process of hiding the implementation details from the user, only the functionality will be provided to the user. **In other words, the user will have the information on what the object does instead of how it does it.**In Java, abstraction is achieved using **Abstract classes and interfaces**.

Data hiding means we are providing security to data within the class.

Abstraction means hiding the code by defining member functions.

Encapsulation is the combination of abstraction and data hiding, means we are wrapping data and code associated with that data. For ex bean class

1. **class** student {
2. **private** **int** age; // Data Hiding
3. **public** setAge(){} // Abstraction
4. **public** getAge(){} // Abstraction
5. }

student class is encapsulated.

encapsulation = data hiding + abstraction

**Data Abstraction**and **Encapsulation**in Java are two important Object oriented programming concept and they are completely different to each other.

1. **Encapsulation**is a process of binding or wrapping the data and the codes that operates on the data into a single entity. This keeps the data safe from outside interface and misuse.
2. **Data Abstraction**is the concept of hiding irrelevant details. In other words make complex system simple by hiding the unnecessary detail from the user.
3. Abstraction is implemented in Java using**interface** and **abstract class**while Encapsulation is implemented using **private**, **package-private**and **protected**access modifiers.
4. **Data Abstraction**solves the problem in the **design level**. Where as **Encapsulation**solves the problem in the **implementation level.**

**Difference between Abstraction and Encapsulation**

**Abstraction**

* 1: **Abstraction**is the concept of hiding irrelevant details. In other words make complex system simple by hiding the unnecessary detail from the user.
* 2: Abstraction solves the problem in the design level.
* 3: Abstraction lets you focus on what the object does instead of how it does it
* 4: **Abstraction**solves the problem in the **design level**. For Example:-  
  Look of a Mobile Phone, like it has a display screen and keypad buttons to dial a number.

**Encapsulation**

* 1: Encapsulation solves the problem in the implementation level.
* 2: Encapsulation means hiding the code and data into a single unit to protect the data from outside world.
* 3: Encapsulation means hiding the internal details or mechanics of how an object does something.
* 4: **Encapsulation**solves the problem in the **implementation level.**  
  For Example:- Implementation detail of a Mobile Phone, how keypad button and Display Screen are connect with each other using circuits.