

Inheritance

One of the core principles of Object-Oriented Programming – **inheritance** – **enables us to reuse existing code or extend an existing type.**

In Java, a class can inherit another class and multiple interfaces, while an interface can inherit other interfaces.

For Example :

An E-commerce Application

(Imagine an e-commerce platform , you offer multiple product to your customers. Even though every thing is different products which is not related to each other like electronics, clothes , groceries etc., but they all have common attributes like product name, product price and behaviours like `viewProductDetails()`).

- > Electronics might have attributes like warranty, brand, and behaviour like `productExchange()`
- > Similarly clothes might have attributes like size, material , brand and behaviour like `showSizeChart()`

But these products must have attributes like `productName` , `productPrice` and behaviour like `viewProductDetails()`

It makes sense to create a basic design of a Product and extend it to create specialised products , rather than designing each product info separately ,from scratch.

- > base type : is also called as a super class or parent class
 - > specialised type : is also called as a derived class or a child class
- This child class will have all the attributes and behaviours of the parent class.

Why should we create inheritance ?

It helps to re-use the code which is easy to manage.

When should we create inheritance ?

When there is generalization and specialization .

How can achieve inheritance?

By using extend and implements keywords.

```
class Product {  
    String name;  
    double price;  
  
    void displayDetails() {
```

```
        System.out.println("Product: " + name);
        System.out.println("Price: ₹" + price);
    }
}

// 🖥️ Electronics subclass
class Electronics extends Product {
    String brand;
    int warranty; // in months

    @Override
    void displayDetails() {
        super.displayDetails();
        System.out.println("Brand: " + brand);
        System.out.println("Warranty: " + warranty + " months");
    }
}

// 👕 Clothing subclass
class Clothing extends Product {
    String size;
    String material;

    @Override
    void displayDetails() {
        super.displayDetails();
        System.out.println("Size: " + size);
        System.out.println("Material: " + material);
    }
}

public class ECommerceApplication {
    public static void main(String[] args) {
        // Create different product types
        Electronics laptop = new Electronics();
        laptop.name = "MacBook Air";
        laptop.price = 120000.0;
        laptop.brand = "Apple";
        laptop.warranty = 24;

        Clothing tshirt = new Clothing();
        tshirt.name = "Polo T-Shirt";
        tshirt.price = 1500.0;
        tshirt.size = "L";
        tshirt.material = "Cotton";
    }
}
```

