Multiple Inheritance

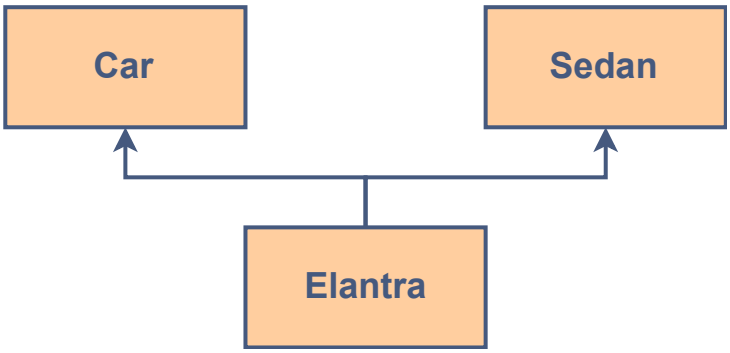
In this lesson, you'll learn what multiple inheritance is and how it can be implemented in Java.

We'll cover the following

What Is Multiple Inheritance?

When a class is derived from more than a single base class, i.e. when a class has more than one immediate parent classes, it is an instance of **Multiple Inheritance**. **Example:**

- A Hyundai `Elantra` **IS A** `Car`
- A Hyundai `Elantra` **IS A** `Sedan` as well



How to Implement

As mentioned earlier, in Java, a class can't extend from more than one class. So the question arises, "*how can we implement multiple inheritance?*"

The answer to the above question is ***Interfaces***. In Java, *multiple inheritance* can be implemented using interfaces.

> A class can `implement` more than one interfaces and an interface can `extend` from more than one interfaces.

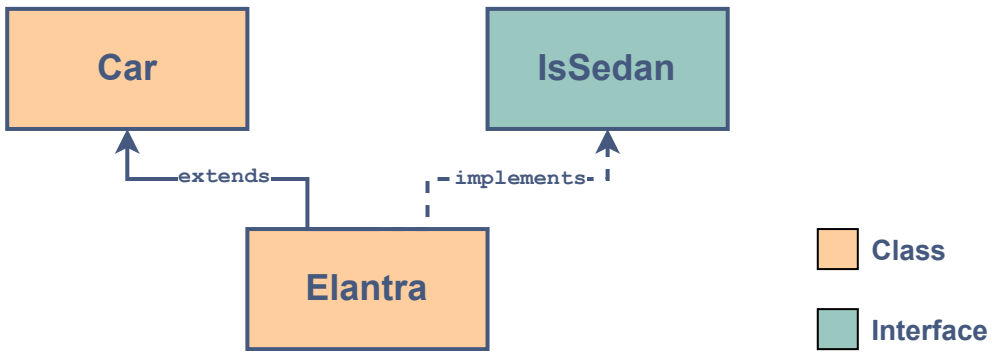
So in this way, we can achieve multiple inheritance in Java.

An Example

Let's implement the example of Elantra given at the start of the lesson. This example can be implemented using:

- A base *class* named `Car`
- An *interface* named `IsSedan`
- An `Elantra` class derived from `Car` and implementing `IsSedan`

The above illustration then becomes:



Below is the implementation:

```
class Car {  // Base class

  private int model;  // Common features of all cars
  private String manufacturer;

  public Car(int model, String manufacturer) {  // Constructor
    this.model = model;
    this.manufacturer = manufacturer;
  }

  public void printDetails() {

    System.out.println("The model of " + getClass().getSimpleName() + " is: " + model);
    System.out.println("The manufacturer of " + getClass().getSimpleName() + " is: " + manufa
  }

}  // End of Car class
```

```
interface IsSedan {  // Interface for sedans


  int bootSpace = 420;  // Sedans have boot space

  void bootSpace();    // Every sedan must implement this

}  // End of IsSedan interface

class Elantra extends Car implements IsSedan {  // Elantra is a Car and is a Sedan also

  private String variant;    // Elantra's data member

  public Elantra(int model, String variant) {  // Constructor
    super(model, "Hyundai");  // Calling the parent constructor with alredy known manufacture
    this.variant = variant;
  }

  @Override
  public void bootSpace() { // Implementation of the interface method
    System.out.println("The bootspace of Elantra is: " + IsSedan.bootSpace +" litres");
  }

  @Override
  public void printDetails() {  // Overriding the parent class's inherited method
    super.printDetails();    // Calling the method from parent class
    System.out.println("The variant of Elantra is: " + variant); // printing the data member
  }

}  // End of Elantra class


class Main {

  public static void main(String[] args) {

    Elantra sport = new Elantra(2019, "Sport");  //creating Sports variant Elantra
    Elantra eco = new Elantra(2018, "Eco");      //creating Eco variant Elantra

    sport.printDetails();
    sport.bootSpace();

    System.out.println();

    eco.printDetails();
    eco.bootSpace();
  }

}
```

Now that we've implemented multiple inheritance, let's take a look at the differences between an interface and an abstract class.

Interface vs Abstract Class

Interfaces and abstract classes are both used to achieve abstraction but with some of the key differences:

Interfaces	Abstract Classes
Can have abstract method(s) only.	Can have concrete (non-abstract) & abstract method(s)
Support multiple inheritance	Don’t support multiple inheritance
All members are `public`	Can have `private`, `protected` and `public` members
All data members are `static` and `final`	Can have non-static and non-final members too
Can’t have constructors	Constructors can be defined