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20-Need For Inheritance

Inheritance in Java

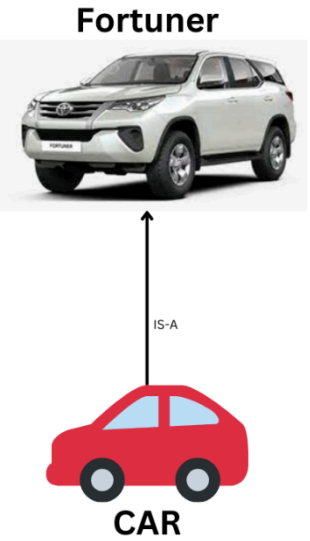
Object-Oriented Programming (OOP):
When discussing Object-Oriented Programming (OOP), concepts like classes, objects, and encapsulation are fundamental. One of the most important concepts within OOP is **inheritance**.

The Need for Inheritance

Understanding "Is-A" and "Has-A" Relationships:

- **Has-A Relationship:**
  Consider a computer as an abstract concept. It could be a laptop, desktop, or mobile device—it's not specific, just a hardware device. When discussing a desktop, for example, we might say that the desktop *has* hardware, *has* a keyboard, and *has* a mouse. These relationships describe composition, where an object contains other objects.

- **Is-A Relationship:**
  Now, take the example of a Toyota Fortuner, a popular car in India. When referring to it, we say "Fortuner *is a* Car." The phrase "is a" emphasizes the relationship of inheritance. Here, the Fortuner inherits the general characteristics of a car but also includes specific features that distinguish it from other cars.



Real-World Example of Inheritance

In Java, inheritance is a mechanism where one class can inherit properties and methods from another class. Let's consider the example of a calculator:

- **Basic Calculator (Calc):**
  This class might include variables and methods for basic operations like addition, subtraction, and division.

- **Advanced Calculator (AdvCalc):**
  This class represents a scientific calculator with advanced features, in addition to the basic operations.

Inheritance Relationship:

- AdvCalc ***inherits*** from Calc. This means AdvCalc can use the properties and methods of Calc and add its own specialized features.

Key Terms in Inheritance

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- **Parent Class / Superclass / Base Class:**
  The class from which properties and methods are inherited. In this example, Calc is the parent class.
- **Child Class / Subclass / Derived Class:**
  The class that inherits from another class. Here, AdvCalc is the child class.

- **Inheritance and the extends Keyword in Java**
- In Java, inheritance is implemented using the `extends` keyword. This keyword allows one class (the child class or subclass) to inherit the properties and methods of another class (the parent class or superclass).

- **Syntax:**

```
class ParentClass {
    // Fields and methods
}

class ChildClass extends ParentClass {
    // Fields and methods specific to ChildClass
}
```