GLA UNIVERSITY
MATHURA
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# Inheritance

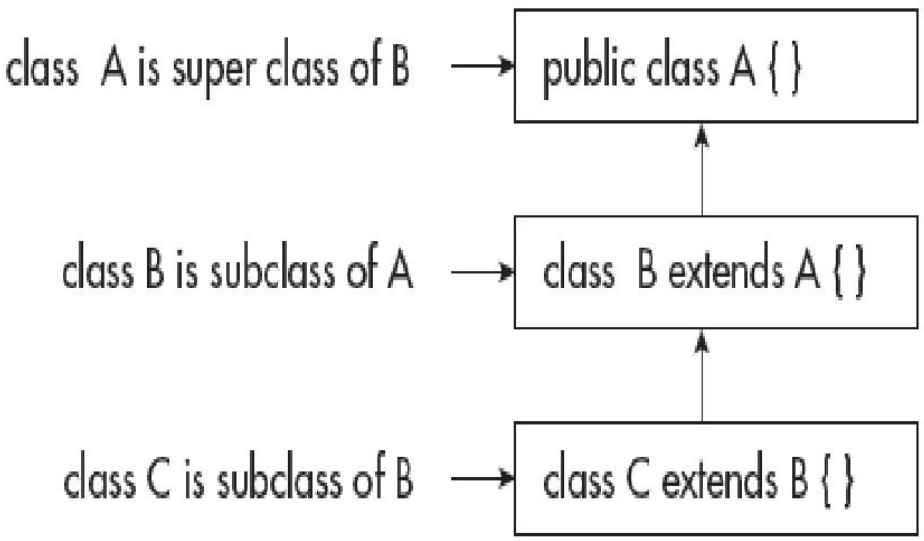
# Introduction

- Inheritance is the backbone of object-oriented programming (OOP).
- It is the mechanism by which a class can acquire properties and methods of another class.
- Using inheritance, an already tested and debugged class program can be reused for some other application.

# Introduction

- **Super class** This is the existing class from which another class, that is, the subclass is generally derived.
- In Java, several derived classes can have the same super class.
- **Subclass** A class that is derived from another class is called subclass.
- In Java, a subclass can have only one super class.

# Inheritance




(a) Hierarchy of classes


(b) No subclass allowed

# Process of Inheritance

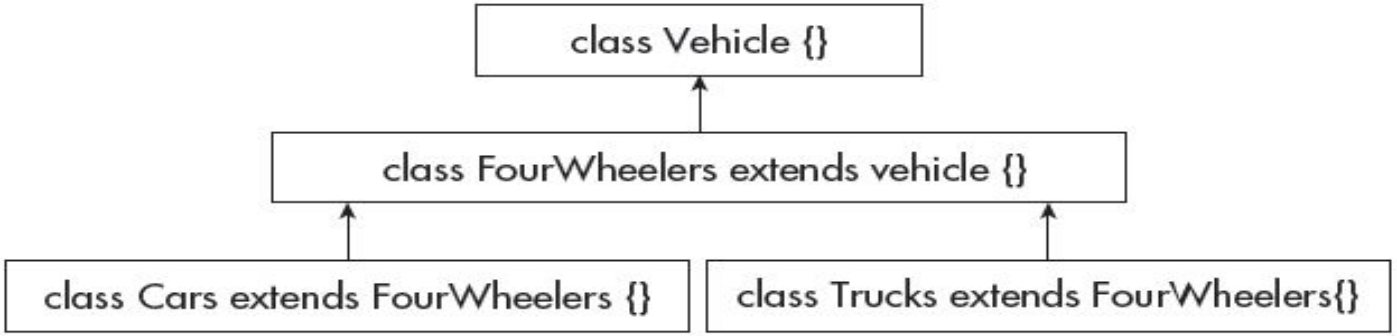
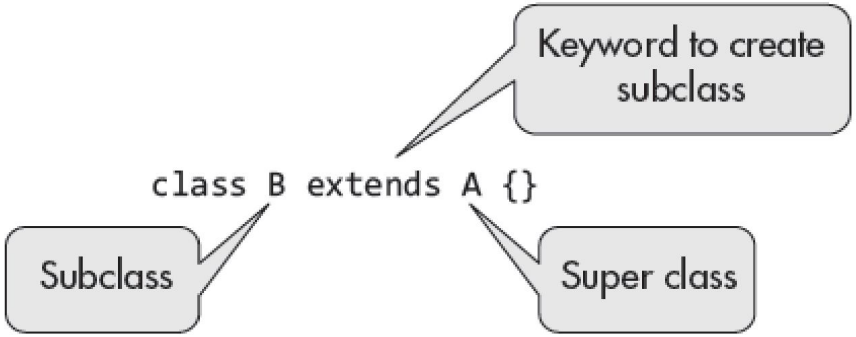



**Fig. 8.4** Example for process of inheritance



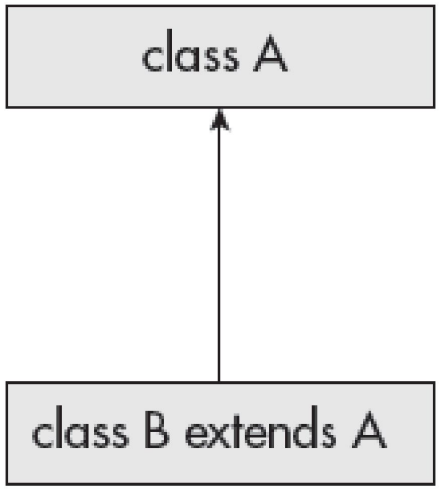
# Types of Inheritance

The following types of inheritances are supported by Java.

1. Single inheritance
2. Multilevel inheritance
3. Hierarchical inheritance
4. Multiple inheritance using interfaces

# Types of Inheritance

(i) Single inheritance: It is the simple type of inheritance. In this, a class extends another one class only.

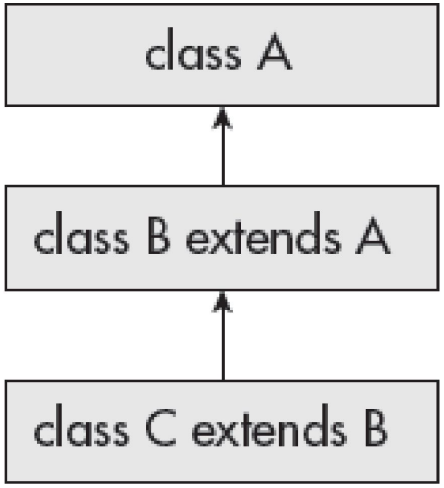


# Types of Inheritance

(ii) Multilevel inheritance: In this type, a derived class inherits a parent

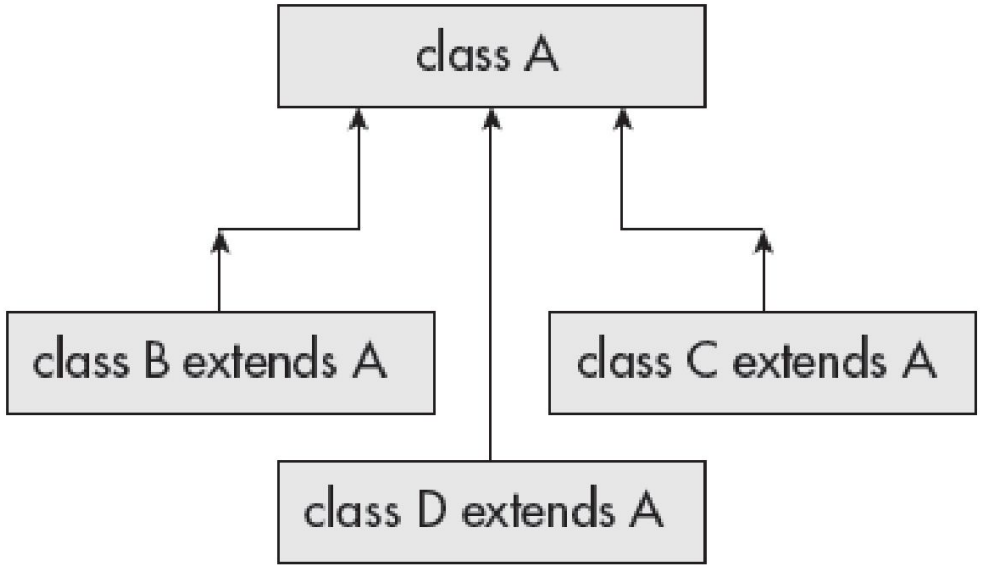
or super class;

- The derived class also acts as the parent class to other class.



# Types of Inheritance

- Hierarchical inheritance: In this type, one class is inherited by many sub classes.




(c)

# Types of Inheritance

- Multiple inheritance: In this, a class is extending more than one class.
- Java does not support multiple inheritance through classes.
- This implies that a class cannot extend more than one class.
- Suppose there is a method in class A. This method is overridden in class B and class C in their own way.
- Since class C extends both the classes A and B.
- So, if class C uses the same method, then there will be ambiguity as which method is called.
- We can implement the multiple inheritance in java by using the Interface

# Universal Super Class—Object Class

- Object class is a special class and it is at the top of the class hierarchy tree.
- It is the parent class or super class of all in Java.
- Hence, it is called Universal super class.
- Object is at the root of the tree and every other class can be directly or indirectly derived from the Object class.

# Access Control and Inheritance

**Table 8.4** Access control

| Class | Access permitted (Yes/No) | | | |
|---|---|---|---|---|
| | No specifier | Public | Protected | Private |
| Same class members | Yes | Yes | Yes | Yes |
| Subclass in same package | Yes | Yes | Yes | No |
| Any other class in same package | Yes | Yes | Yes | No |
| Subclass in different package | No | Yes | Yes | No |
| Any other class in different package | No | Yes | No | No |