Subject: SBL-OOPM **Class: SE-DS**
Semester: III **A.Y. 2022-2023**

Experiment No. 7

- **Aim :** Write a Java Program to demonstrate different inheritances in java.
- **Objectives :** To learn use of reusability in java program by accessing allproperties written in one class in to other class.
- **Prerequisites :** Students should know disadvantages of Procedure oriented programming language & the need of OOPs concepts to overcome those disadvantages.
- **Software used :** jdk 1.6.0

- **Theory :**

➢ The process by which one class acquires the properties(data members) and functionalities(methods) of another class is called **inheritance**.

➢ The aim of inheritance is to provide the reusability of code so that a class has to write only the unique features and rest of the common properties and functionalities can be extended from the another class.

➢ The biggest **advantage of Inheritance** is that the code that is already present in base class need not be rewritten in the child class.

➢ The idea behind inheritance in java is that you can create new classes that are built upon existing classes. When you inherit from an existing class, you can reuse methods and fields of parent class. Moreover, you can add new methods and fields in your current class also.

➢ Inheritance represents the **IS-A relationship**, also known as *parent-child* relationship.

➢ **Basic Terminologies used in Inheritance :**

- **Child Class:**
- The class that extends the features of another class is known as child class, subclass or derived class.
- **Parent Class:**
- The class whose properties and functionalities are used(inherited) by anotherclass is known as parent class, super class or Base class.
- **Reusability :**

As the name specifies, reusability is a mechanism which facilitates you to reuse the fields and methods of the existing class when you create a new class.You can use the same fields and methods already defined in previous class.

➢ **Syntax:**

```
Class ABC
{
```

Body of ABC Class

}

class XYZ extends ABC

{

Body of XYZ class;

}

- To inherit a class we use extends keyword.

- The extends keyword indicates that you are making a new class that derives from an existing class.

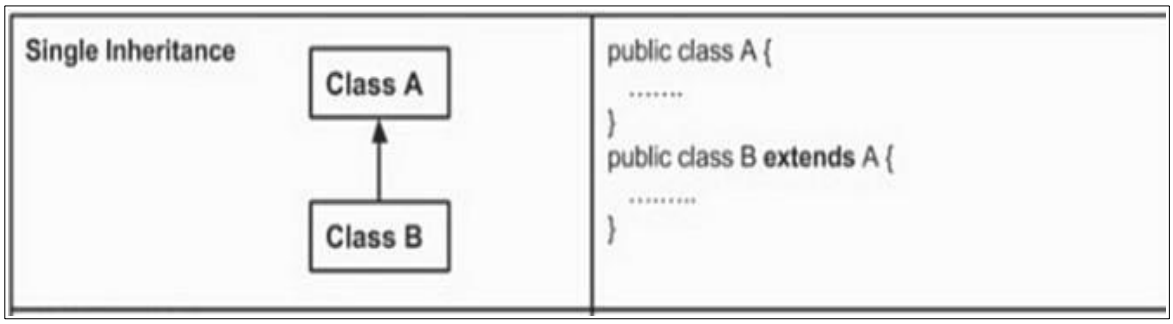
- Here class XYZ is child class and class ABC is parent class. The class XYZ is inheritingthe properties and methods of ABC class.

- **Note:**
  The derived class inherits all the members and methods that are declared as public orprotected.
  If the members or methods of super class are declared as private then the derivedclass cannot use them directly.
  The private members can be accessed only in its own class. To access the private members of the parent class in child class, we need to use getter and setter methods.

- **TYPES OF INHERITANCE :**

1. Single Inheritance:

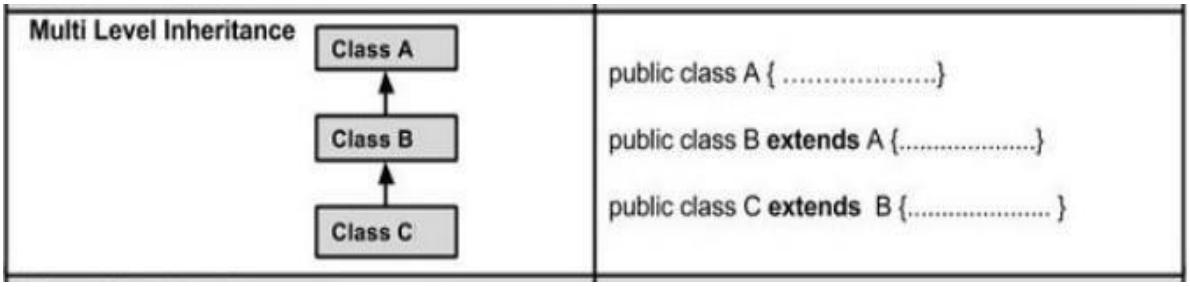
- In this type of inheritance one derived class inherits from only one base class.
- It is the most simplest form of Inheritance.



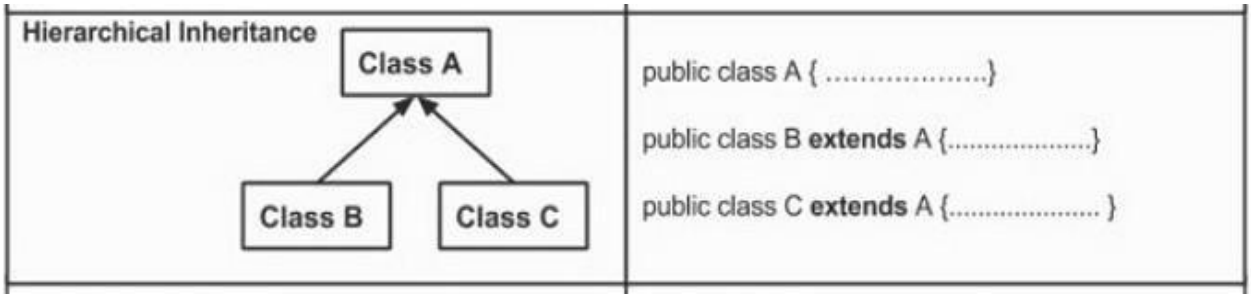
2. Multilevel Inheritance :

In this type of inheritance the derived class inherits from a class, which in turninherits from some other class. The Super class for one, is sub class for the other.

3. Hierarchical Inheritance :

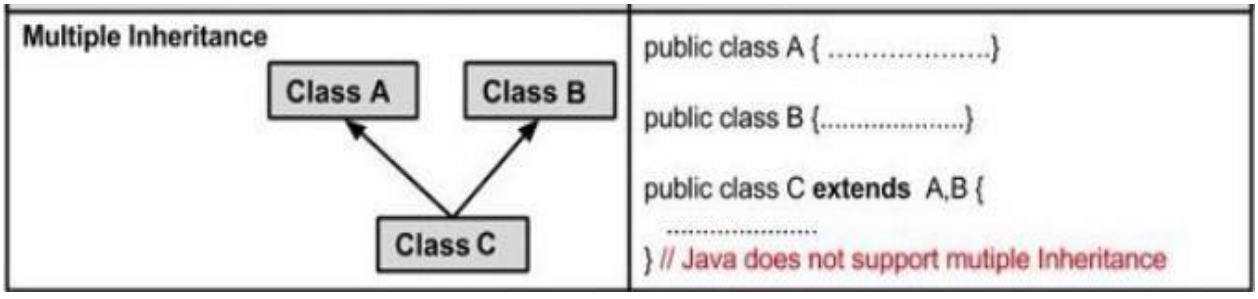


- In this type of inheritance, multiple derived classes inherits from a single baseclass



4. Multiple Inheritance :

- In Multiple inheritance ,one class can have more than one superclass and inheritfeatures from all parent classes.
- Please note that Java does not support multiple inheritance with classes. In java, wecan achieve multiple inheritance only through Interfaces.

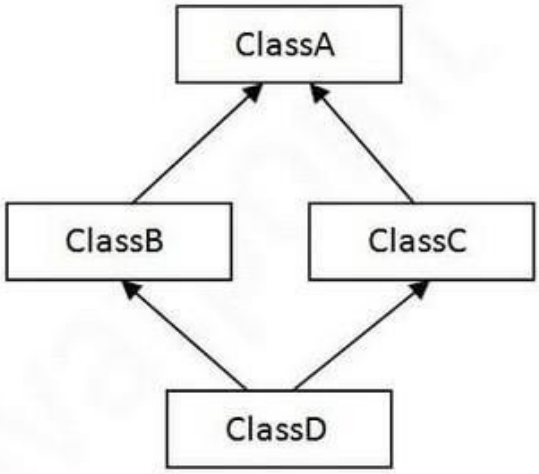


- ***Why multiple inheritance is not supported in java?***
- *To reduce the complexity and simplify the language, multiple inheritance isnot supported in java.*
- *Consider a scenario where A, B and C are three classes. The C class inherits Aand B classes. If A and B classes have same method and you call it from child class object, there will be ambiguity to call method of A or B class.*
- *Since compile time errors are better than runtime errors, java renders compiletime error if you inherit 2 classes. So whether you have same method or different, there will be compile time error*

now.

5. Hybrid (Virtual) Inheritance :

- It is a mix of two or more of the above types of inheritance.
- Most of the time Hybrid Inheritance is combination of Hierarchical and Mutilevel Inheritance.
- Since java doesn't support multiple inheritance with classes, the hybrid inheritance isalso not possible with classes.
- In java, we can achieve hybrid inheritance only through Interfaces.



➢ **CONCLUSION :**

Summaries what you studied from this experiment