Inheritance

Module 5

OOP (IT 2005)

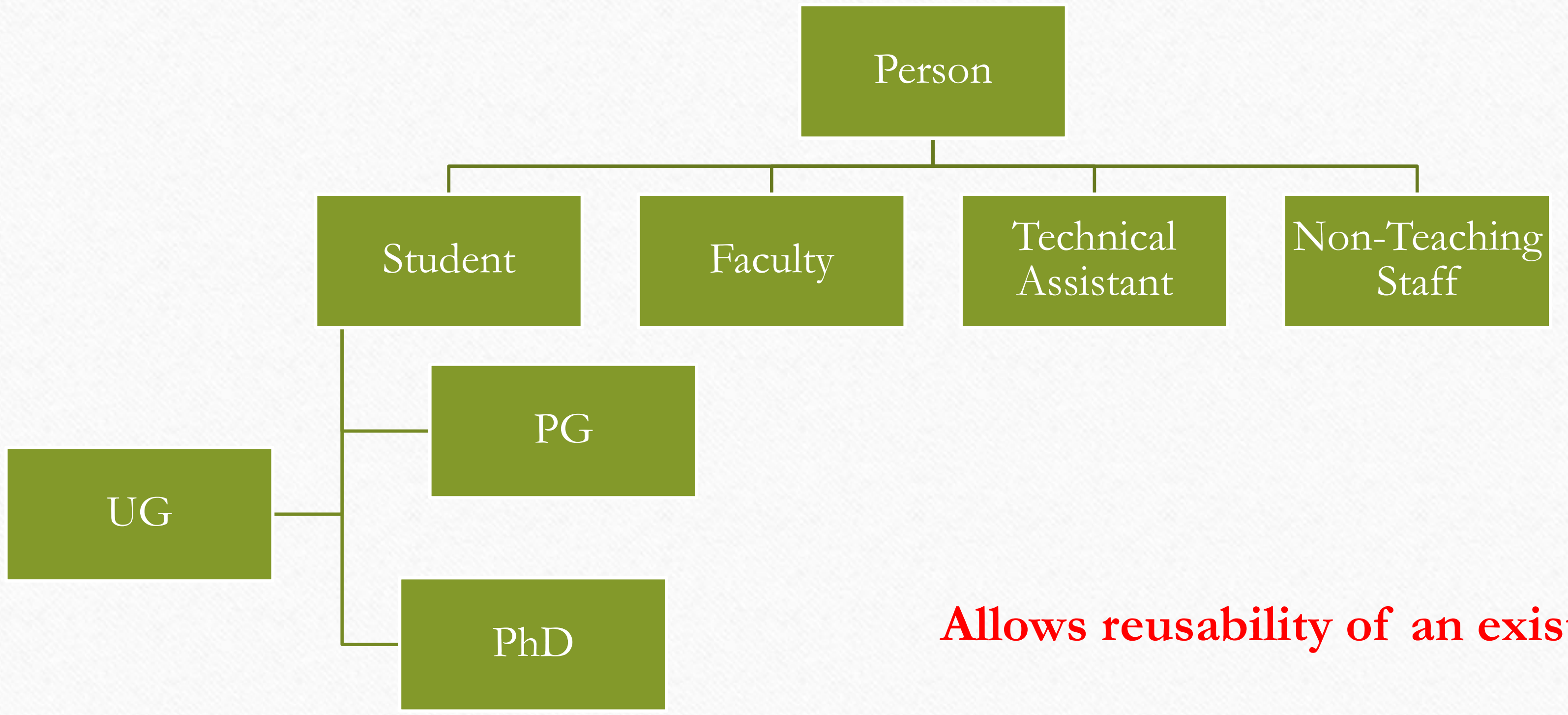
4th Semester ECSc

Contents

What is an inheritance in OOP?

- The capability of a class to inherit the properties of some other class is known as an inheritance.
- The class whose properties are inherited is called the **base class**, while the class which inherits the properties is known as the **derived class**.

Need of Inheritance



Allows reusability of an existing class

Access Specifiers

- Three types of access specifiers
- Public
  - Lowest and most open level of data hiding
- Private
  - Highest level of data hiding
- Protected
  - Less restricted than private but more restricted than the public

Visibility of Access Specifier

Syntax of a derived class:

class derived_class_name : [access-specifier] base_class_name

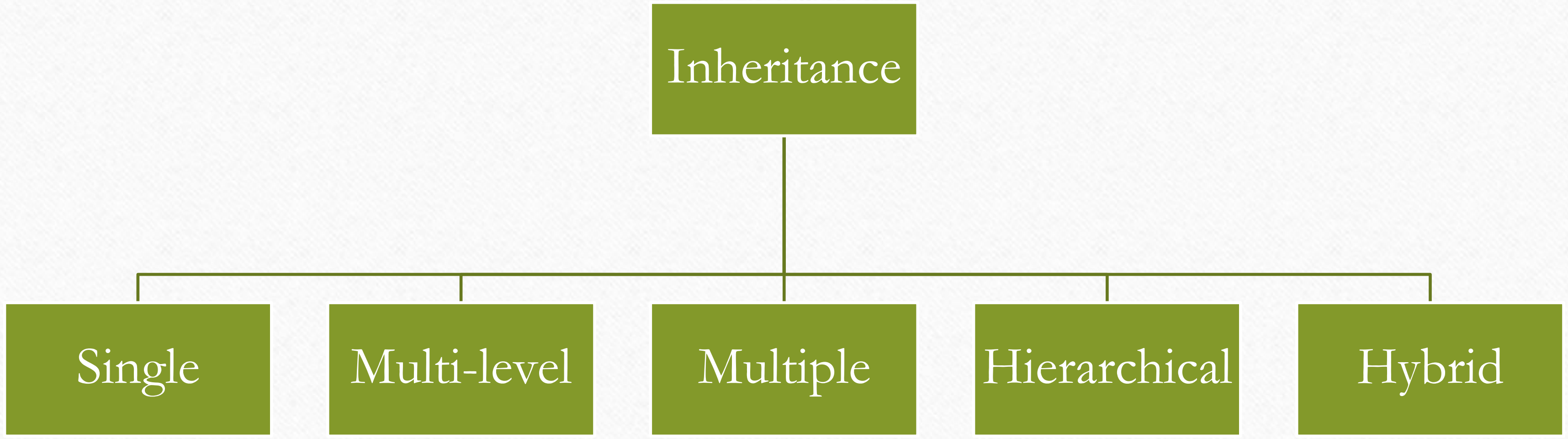
{

// class body;

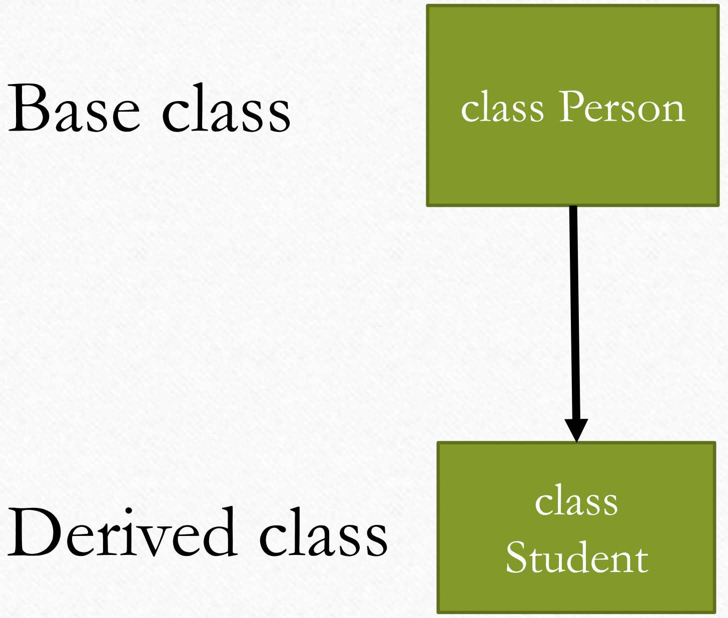
};

Specifier	Same Class	Derived Class	Non-derived Class	Friend Function	Friend Class
Public	Yes	Yes	Yes	Yes	Yes
Private	Yes	No	No	Yes	Yes
Protected	Yes	Yes	No	Yes	Yes

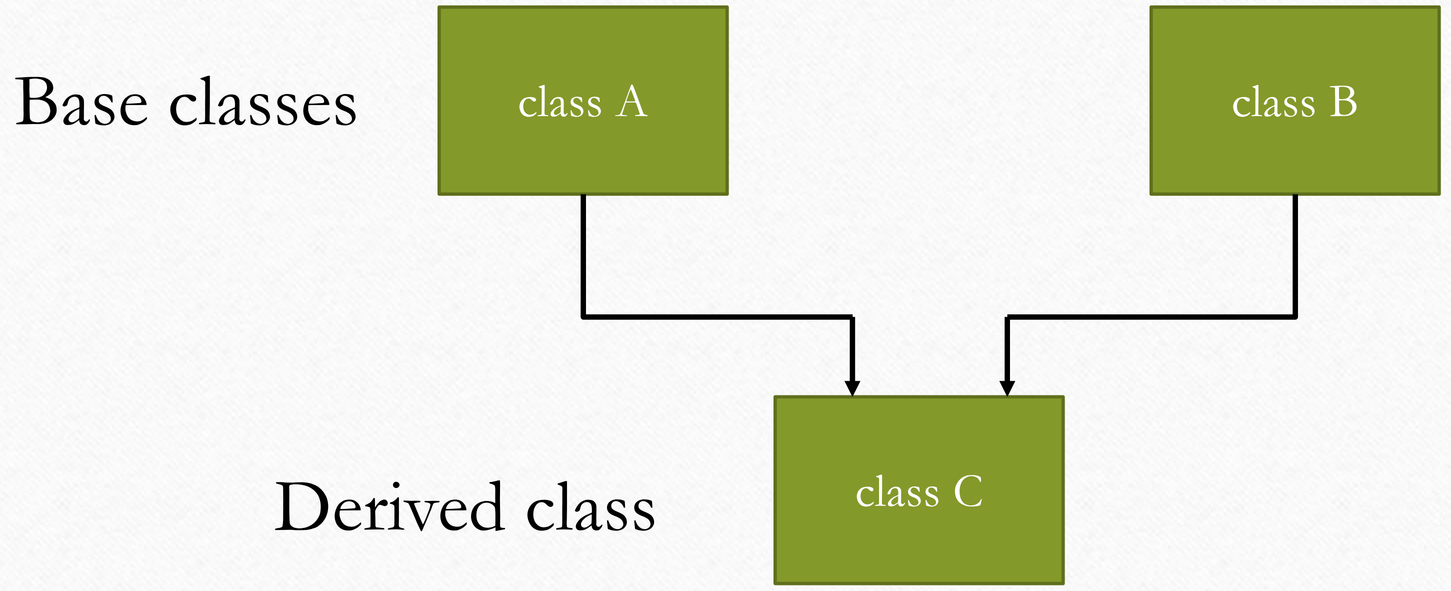
Types of Inheritance



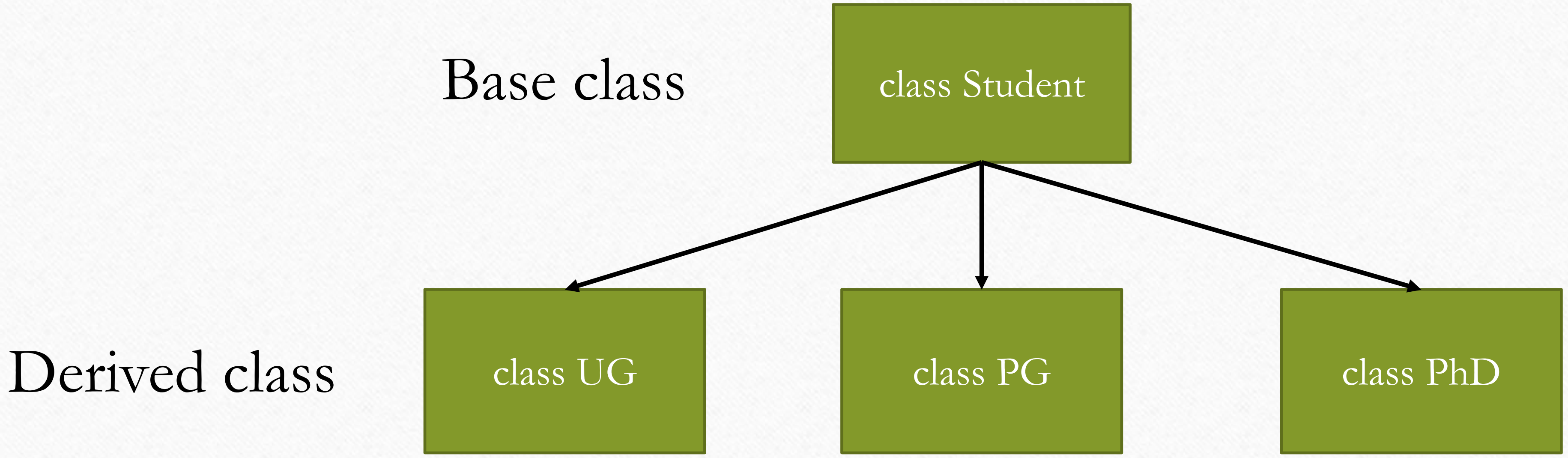
Single Inheritance



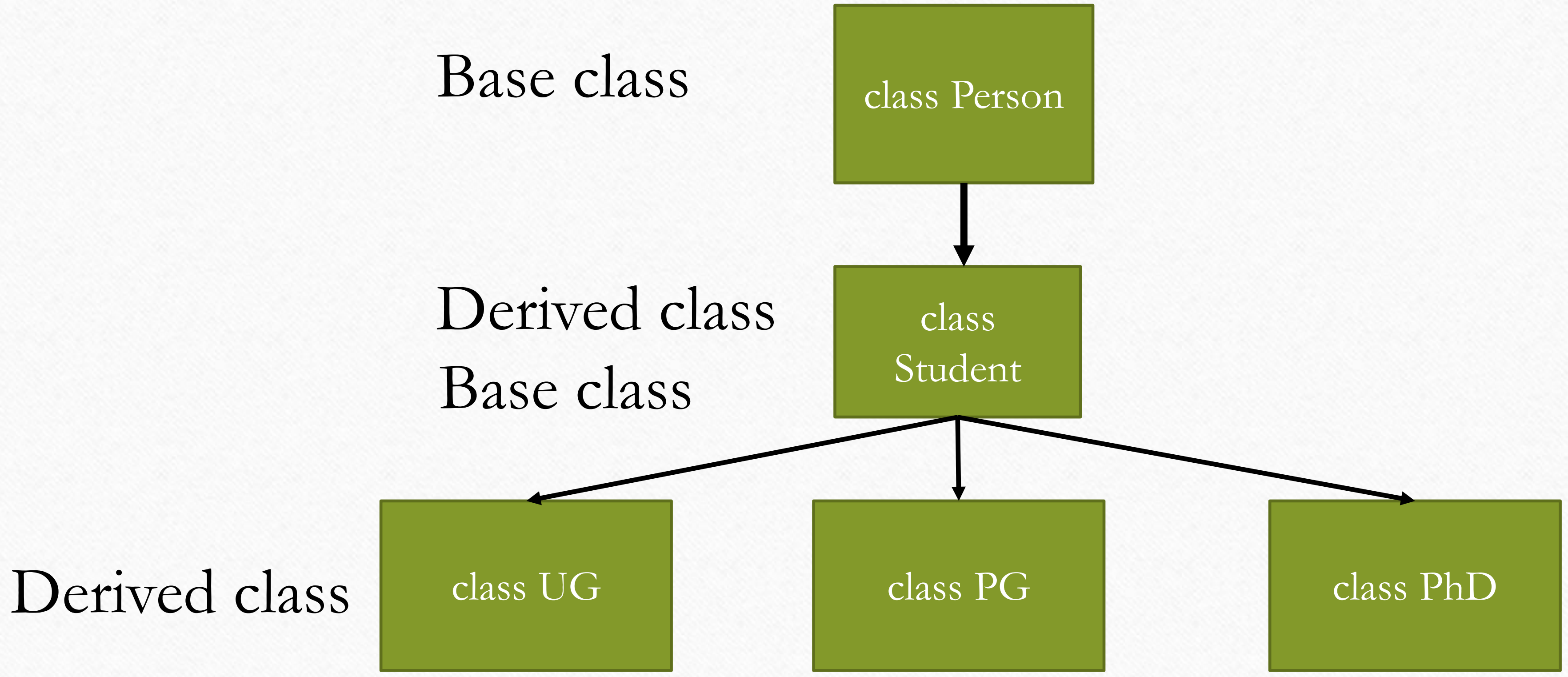
Multiple Inheritance



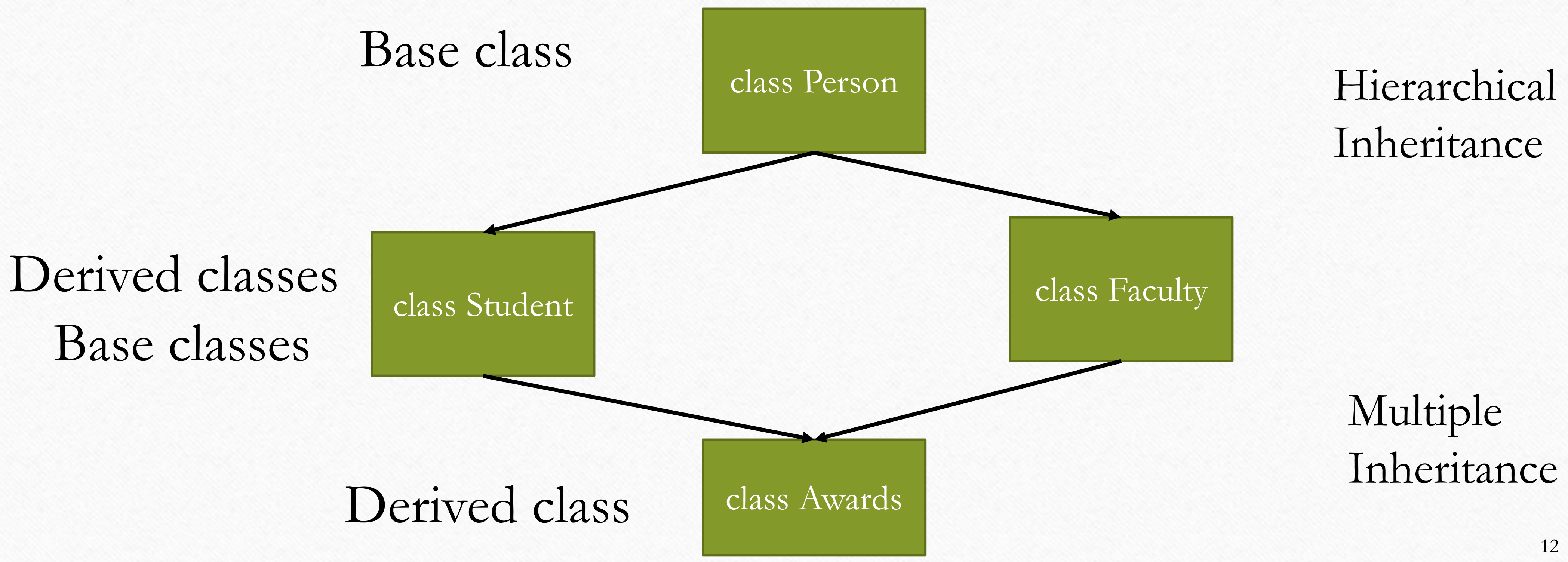
Hierarchical Inheritance



Multi-level Inheritance

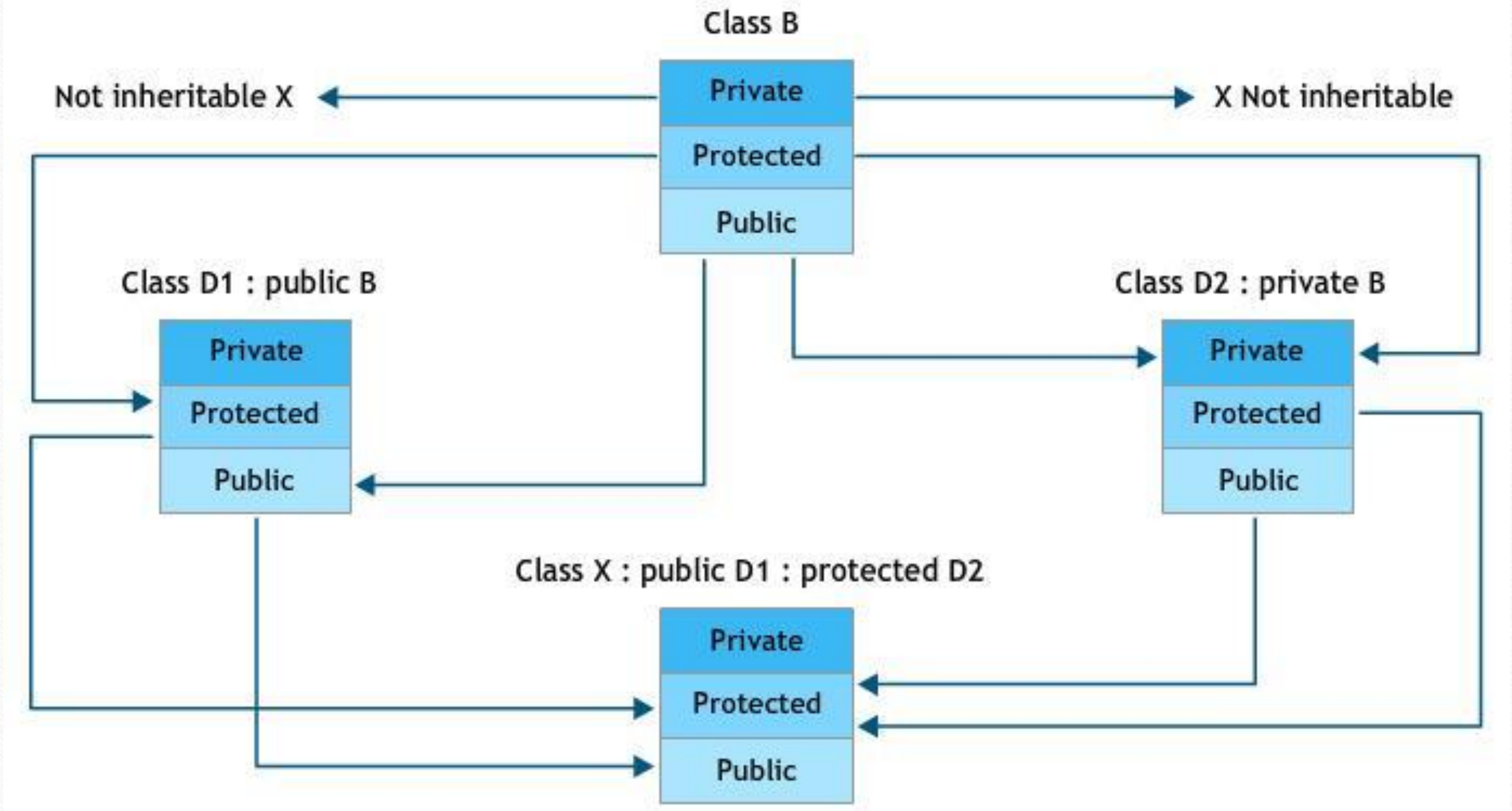


Hybrid Inheritance



Effect of Inheritance on the Visibility of Members

- See the next slide


Class B
Private
Protected
Public
Not inheritable X
X Not inheritable
Class D1 : public B
Private
Protected
Public
Class D2 : private B
Private
Protected
Public
Class X : public D1 : protected D2
Private
Protected
Public

Questions for Self-Study

- Explain the need for inheritance.
- Explain the significance of different access specifiers used in inheritance.
- What happens when a protected member is inherited in private mode and public mode?
- Explain the different types of inheritance.
- Differentiate between public, private and protected inheritance with suitable examples.

Questions for Self-Study

- Explain the concept of single inheritance with the help of a suitable program.
- Explain the concept of multiple inheritance with the help of a suitable program.
- Explain the concept of multi-level inheritance with the help of a suitable program.
- Explain the concept of hierarchical inheritance with the help of a suitable program.

Questions for Self-Study

- In multiple inheritance, what is the order of calling the constructors? Explain with a suitable program.
- How do the properties of the following two derived classes differ?
    - class D1: private B { // class definition };
    - class D2: public B {// class definition };
- What are the implications of the following two definitions?
    - class A : public B, public C {// class definition };
    - class A : public C, public B {// class definition};

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