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**Introduction to 'C++' Language**

**Inheritance in C Plus Plus**

**Module 1 - Introduction to Inheritance in C Plus Plus**

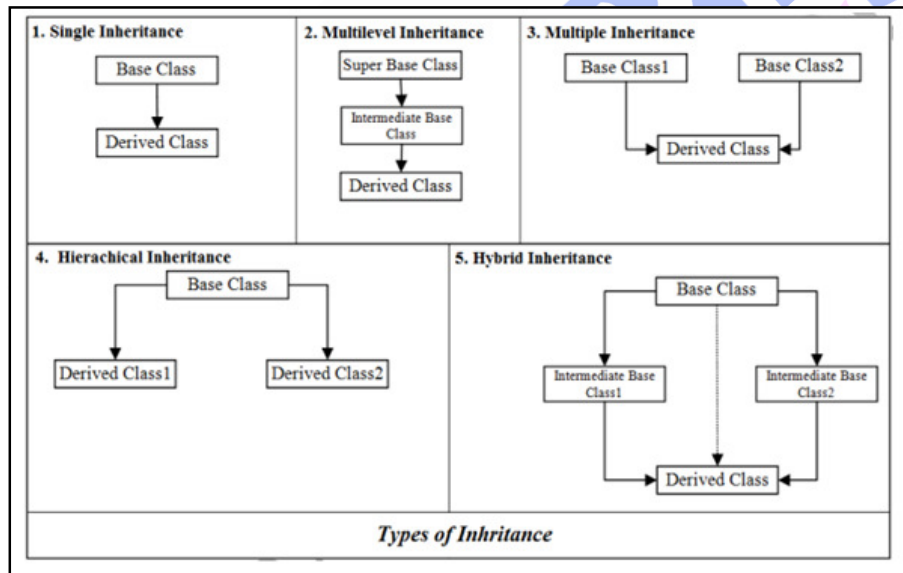
**Inheritance:**

The ability to access members of one class by another class called inheritance. At least two classes are required for inheritance.

1. Base class (Old class / Super class): A class that provides members to another class called base class.
2. Derived class (New class / sub class): A class that can access members of base class called derived class. Derived class can access only protected and public members of base class.

**Types of inheritance:**

In C++, inheritance can be implemented in following ways.



1. Single Inheritance: A class (derived class) inherits from a single base class.
2. Multiple Inheritance: A class inherits from more than one base class.
3. Hierarchical Inheritance: Multiple classes inherit from a single base class.
4. Multilevel Inheritance: A class inherits from another derived class, forming a chain.

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5. Hybrid Inheritance: A combination of more than one type of inheritance (e.g., multiple + hierarchical).

Base Class and Derived Class in C++

**Base Class and Derived Class** are fundamental concepts in object-oriented programming (OOP). They are part of inheritance, where the derived class inherits properties and behaviors from the base class.

Base Class

The **base class** (also called the parent or superclass) is the class whose members are inherited by another class. It contains common attributes and methods that can be shared across multiple derived classes.

Base Class Syntax:

```
class BaseClass {
    // Access specifier (public, private, protected)
    // Data members (attributes)
    // Member functions (methods)
};
```

Base Class Example:

```
class Vehicle {
public:
    int wheels;

    void displayVehicle() {
        cout << "This is a vehicle with " << wheels << " wheels." << endl;
    }
};
```

Derived Class

The **derived class** (also called the child or subclass) is the class that inherits from the base class. It can:

- Use all public and protected members of the base class.
- Add its own unique members.
- Override base class methods if needed.

Derived Class Syntax:

```
class DerivedClass : accessSpecifier BaseClass {
```

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```
// Access specifier (public, private, protected)  
// Additional data members  
// Additional member functions  
};
```

**Derived Class Example:**

```
class Car : public Vehicle {  
public:  
    string brand;
```

```
    void displayCar() {  
        cout << "This car is a " << brand << " and has " << wheels << " wheels." <<  
    }  
};
```

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