Subject Name: **Object Oriented Programming Using C++**

Subject Code: **BCA-301 N**

Subject Topic: **Multilevel and Hierarchical Inheritance**

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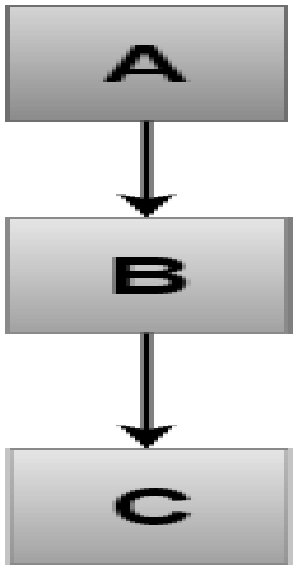
Multilevel Inheritance

- When a class is derived from a class which is also derived from another class, i.e. a class having more than one parent classes, such inheritance is called **Multilevel Inheritance**. The level of inheritance can be extended to any number of level depending upon the relation. Multilevel inheritance is similar to relation between grandfather, father and child.



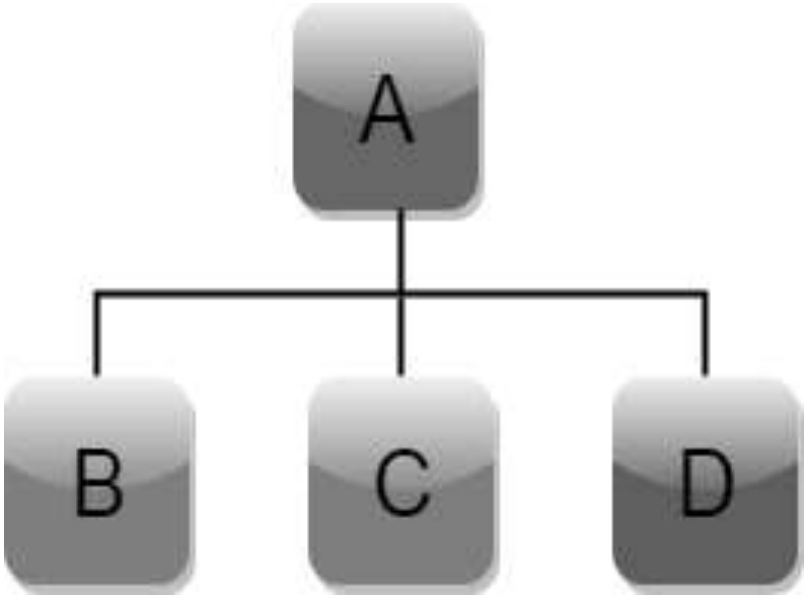
Example

```
class Animal
{
  public:
    void eat()
    {
      cout<<"Eating..."<<endl;
    }
  };
  class Dog: public Animal
  {
     public:
      void bark()
    {
            cout<<"Barking..."<<endl;
     }
 };
```

```
class BabyDog: public Dog
  {
     public:
                    void weep()
          {
            cout<<"Weeping...";
                    }
  };
void main()
{
   BabyDog d1;
   d1.eat();
   d1.bark();
    d1.weep();
    getch();
}
```

Hierarchical Inheritance

- In this type of inheritance, more than one sub class is inherited from a single base class. i.e. more than one derived class is created from a single base class.



Example

```
class Shape                    // Declaration of base class.
{
    public:
    int a;
    int b;
    void get_data(int n,int m)
    {
        a= n;
        b = m;
    }
};
```

```
class Rectangle : public Shape  // inheriting Shape class
{
   public:
   int rect_area()
   {
      int result = a*b;
      return result;
   }
};
class Triangle : public Shape    // inheriting Shape class
{
   public:
   int triangle_area()
   {
      float result = 0.5*a*b;
      return result;
   }
};
```

```
void main()
{
    Rectangle r;
    Triangle t;
    int length,breadth,base,height;
    cout << "Enter the length and breadth of a rectangle: " << endl;
    cin>>length>>breadth;
    r.get_data(length,breadth);
    int m = r.rect_area();
   cout << "Area of the rectangle is : " <<m<<endl;
   cout << "Enter the base and height of the triangle: " <<endl;
    cin>>base>>height;
    t.get_data(base,height);
    float n = t.triangle_area();
    cout <<"Area of the triangle is : "  << n<<endl;
    getch0;
}
```

References:

- www.studytonight.com
- www.tutorialpoint.com
- www.geeksforgeeks.org
- “Object oriented programming in C++” Robert Lafore
- “Object oriented programming with C++”, E.Balagurusamy