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**Assignment 3**

**Problem Statement**: Implement C++ program to create a base class called shape. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called function get\_data() to initialize base class data members and another member function display\_area() to compute and display the area of figures. Make classes to suit their requirements. Using these three classes, design a program that will accept dimension of a triangle or a rectangle interactively, and display the area. Remember the two values given as input will be treated as lengths of two sides in the case of rectangles, and as base and height in the case of triangles, and used as follows:

Area of rectangle = x\*y

Area of triangle = ½\*x\*y;

# **Aim of the Assignment:** To understand the concept of inheritance of data members and member functions in C++.

# **Description:** In this program, we first create a base class called ‘Shape’, and derive two classes, namely ‘Get\_Data’ and ‘Display\_Area’, which accept the values and display the area respectively. The user is given an option to calculate the area of either a rectangle or a triangle.

**Algorithm**:

Step 1:-Start.

Step 2:- Define class shape.

Step 3:- Initialize variables.

Step4:- Define class rectangle.

Step 5:- Accept the data from user using the getdata() function and display by using displayarea() function.

Step6:- Define class triangle.

Step7:- Accept the data from user using the getdata() function and display by using displayarea() function.

**Concept Used**:

1. Inheritance: The capability of a class to derive properties and characteristics from another class is called Inheritance. Inheritance is one of the most important features of Object Oriented Programming.  
   Sub Class: The class that inherits properties from another class is called Subclass or Derived Class.  
   Super Class:The class whose properties are inherited by sub subclass is called Base Class or Super class.
2. Function Overriding: If derived class defines the same function as defined in its base class, it is known as function overriding in C++. It is used to achieve runtime polymorphism. It enables you to provide specific implementation of the function which is already provided by its base class.
3. Polymorphism: The word polymorphism means having many forms. Typically, polymorphism occurs when there is a hierarchy of classes and they are related by inheritance. C++ polymorphism means that a call to a member function will cause a different function to be executed depending on the type of object that invokes the function. It can be of two types – compile time polymorphism and run time polymorphism.
4. Virtual Function: A virtual function is a function in a base class that is declared using the keyword virtual. Defining in a base class a virtual function, with another version in a derived class, signals to the compiler that we don't want static linkage for this function. What we do want is the selection of the function to be called at any given point in the program to be based on the kind of object for which it is called. This sort of operation is referred to as dynamic linkage, or late binding.

# **Conclusion:** Hence, we have successfully applied the concept of Inheritance, and understood how different data members and member functions of different classes can be used towards one common goal.