**Jaypee University of Engineering and Technology, Guna**

**Department of Computer Science and Engineering**

**Object Oriented Programming Lab (14B17CI371)**

**Lab Exercise-6**

**[Imp Note: All the programs must be written in C++ with distinguished variable names. If any kind of plagiarism is observed, the punctuality marks (10) will be awarded by zero.]**

1. Write a program with a mother class and an inherited daugther class.Both of them should have a method void display () that prints a message (different for mother and daugther).In the main define a daughter and call the display() method on it.
2. There is a class student, that stores name of school or university from which he is enrolled and name of highest degree he has obtained so far. It has the function to get and display the members. Design a class Employee with name and employee number. Derive Manager, Scientist and Laborer classes. The manager class has extra attribute title and dues. The scientist class has extra attributes number of publications. The Laborer class has nothing extra. The classes have necessary functions for set and display the information. A manager or a scientist is employee; and he may be student of a university also. Use inheritance.
3. An educational institution wishes to maintain a database of its employees. The database is divided into a number of classes whose hierarchical relationships are shown in Fig.1. The figure also shows the minimum information required for each class. Specify all the classes and define methods to create the database and retrieve individual information as and when required.



1. 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 triangle and rectangle from the base shape. Add to the base class, a member function get\_data( ) to initialize base class data members and another member function display\_area( ) to compute and display the area of figures. Make display\_area( ) as a virtual function and redefine this function in the derived classes to suit their requirements.
2. Using these three classes, design a program that will accept dimensions 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**

1. Extend the Program-1 to display the area of circle. This requires addition of a new derived class ‘circle’ that computes the area of a circle. Remember, for a circle we need only one value, its radius, but the get\_data() function in the base class requires two values to be passed. (Hint: Make the second argument of get\_data() function as a default one with zero value.)
2. Run the above program with the following modifications:

* Remove the definition of display\_area() from one of the derived classes.
* In addition to the above change, declare the display\_area() as virtual in the base class shape.

Comment on the output in each case.