1. Write a program to demonstrate the implementation of inheritance.

4.1) A company has two types of employees – FullTime and Partime. The company records for each employee his/her name, age, address, salary and gender. Given the basic salary of the FullTime employee the components of his/her gross salary are: Dearness allowance – 75% of basic salary, HRA – 7.5% of basic salary, IT – 10% of basic. The salary of a Partime employee is dependent on the qualification, experience, number of working hours and the rate per hour, as below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Qualification | | |
| Experience | BE | MTech | Ph.D |
| 1-5 years | 300 Rs. | 500 Rs. | 800 Rs. |
| 6-10 years | 400 Rs. | 700 Rs. | 1200 Rs. |
| >10 years | 500 Rs. | 1000 Rs. | 1500 Rs. |

Model this as a problem of hierarchical inheritance by:

1) Identifying the super class with its data members and member functions.

2) Identify the sub-class/sub-classes and their associated data members and member functions.

Test the program by creating objects of the classes that are so identified.

**Additional definitions:**

* 1. Design a base class called Employee who work for a Hospital and this class would have name, dob, address, salary and designation as the attributes. Add a constructor to initialize all these data members. This class would have reportForDuty method to display reporting time and date with a “Welcome” message to the employee. Devise two derived classes Doctor and Nurse to have expertise and yearsofExperience as data members respectively. Devise a method performDuty in each of these derived classes to print appropriate message depending on expertise of doctor and years of experience. For instance if the experitise of the Doctor is Surgeon and yearsofExperience >10 then print “Perform Heart Operation” else perform “Perform minor Surgery”. If his expertise is orthopedic and experience is more than 5 years “Perform surgery and Plastering” else “Perform Plastering”. If the nurse has more than 3 years experience in performDuty method print “Check BP, Sugar” and “Administer medicine” else print “Look after the patient”. Create a Hospital Class that has main method, and instantiate objects of Doctor and Nurse and Perform reportForDuty and performDuty and record the output. Add a static method generateReport(Employee e) that accepts object of employee type and prints in a tabular form, Name, dob, birthday salary and the designation.

Note :

To get current time and date create an object of Calendar class declared in java.util package by importing it… import java.util.Calendar. to create calendar object..

Calendar cal=Calendar.getInstance();

To print date and time System.out.println(cal.getTime());

* 1. The class Cylinder inherits all the instance variables (radius and color) and methods (getRadius(), getArea(), among others) from its superclass Circle. It further defines a variable called height, three methods getHeight(), setHeight() and getVolume() and its own constructors. Implement the hierarchy as shown below:

Circle

radius:double = 1.0

color:String = “Red”

Circle()

Circle(radius:double)

Circle(radius:double, color:String)

getRadius():double

setRadius(radius:double):void

getColor():String

getColor(color:String):void

getArea():double

Cylinder

height:double = 1.0

Cylinder()

Cylinder(height:double)

Cylinder(height:double, radius:double)

Cylinder(height:double, radius:double,

color:String)

getHeight():double

setHeight(height:double):void

getVolume():double

4.4 Design an appropriate type of inheritance of classes for an Vehicle insurance company. The Vehicles could be Car, MotorCype or Truck. The vehicle has following attributes, fuelCap, mpg, engineNum, chassiNum, exShowroomPrice, date of purchase. The particular vehicle has numPassengers, color, cc, type(Petrol, Deisel or electric) and for car, categoryofCar(suv or passenger, luxury) to be included as attributes. The truck should have number of wheels and loadCapacity as additional properties. The vehicle class must have display method to display vehicle details whereas the particular type of vehicles should have a overloaded method to display other vehicle details. Add a method called compute insurancePremium based on the following logic..

1. Basic premium = 2% of exShowroomPrice; for all vehicle types
2. A depreciation of 5% per year is to be accounted in basic premium ( basic premium=basic premium\*(1-0.05)^n where n is number of years.
3. If cc <100 cc for two wheeler final premium = basic premium + 12 %GST of basic premium
4. Cc >100 cc for two wheeler an additional cess of 1% of vehicle price is to added to step 2
5. For car final premium = basic premium+12 % GST of basic premium if car is passenger car
6. Basic premium +18% GST of basic if car is SUV or Sports
7. Basic premium + 28% GST if Luxury car
8. For truck = basic +12% GST of basic premium if numWheels =6
9. = basic +18 % GST of basic if numWheels = 10
10. If loadcapacity <50 tonnes 2% cess and >50 tonnes 3% cess on final premium only for trucks.

For car or truck if its diesel the + 1%vehcile price to be added

And if its electric car or twowheeler then 10% discount on the final premium has to be given.

The program should implement all classes and methods and tested for all types of vehicles for correct calculation of premium.