# Practice Set

JAVA Inheritance

1. Define a class Complex to represent an object for a complex number like $Z = X + i.Y$ with the following methods:

```
Complex add(Complex z1, Complex z2) //To add two complex
numbers
Complex sub(Complex z1, Complex z2) //To subtract two complex
numbers
Complex mul(Complex z1, Complex z2) // To multiply two complex
numbers
float magnitude(Complex z)        // To find the modulus
Complex conjugate(Complex z)    // To find the complex conjugate
```

   Write the main class and instantiate the objects of the above-mentioned classes.

2. Write a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea( ) that prints the area of the given shape. [Abstract Class]

3. Write a Java program that counts the number of objects created by using static variable.

4. Write a java program that implements educational hierarchy using inheritance
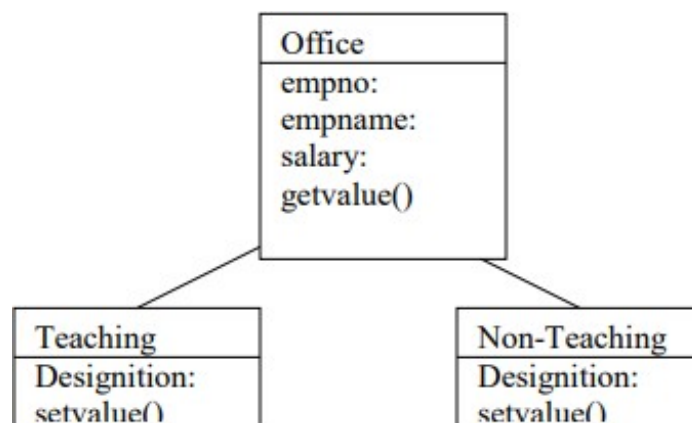
5. Write a java program to find the details of the students eligible to enrol for the examination (Students, Department combinedly give the eligibility criteria for the enrolment class)
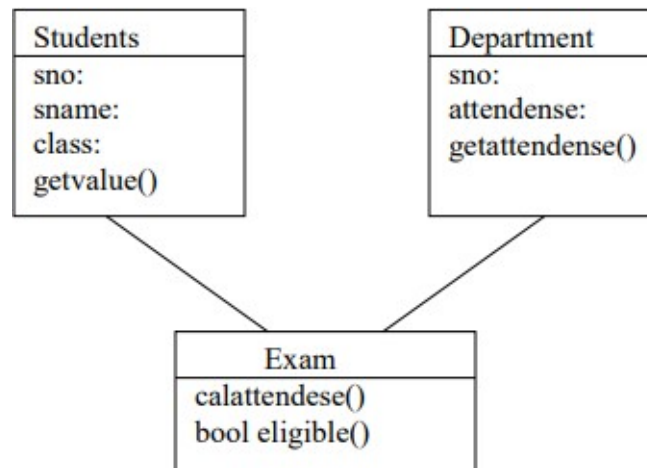
6. Write a java program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading. [Method Overloading]

7. Create a base class vehicle with variables: reg_no (string) and model (integer), read() reads data for the variables. Create a derived class "two-wheeler" with variables: no_gear and power as integer. Create another derived class "scooter" with variables: manufacturer, owner as string. Create a method read() to read data for no_gear. Another function print() that prints the values of the reg_no, model, power, no_gear. [Method Overriding]

8. Write a program of your choice showing how 'super' keyword can be used to differentiate the members of superclass from the members of subclass. The program should also show how to invoke the superclass constructor from subclass using 'super' keyword.

9. A class banking stores account number, type of account (savings or current), Balance amount of each customer. A Customer class which contains Name, Address, Phone number and Date of birth of Banks customers. Each employee of bank is again another class with details Name, EmpID, and Salary. Given the following relationship: Each Employee of bank is a customer with banking details. Implement the above relation using 3 classes (Banking, Employee and Customer). For each employee of bank display his Name, EmpID, Salary, his dob, Phone number and his account amount.

10. Student class: Name, Roll no, Semester, Marks of subjects.
    Branch class: Subject names, Branch
    Lecture Class: Lecture name
    Grade Class: grade
    Consider appropriate multiplicities and relationships between classes when needed.
    Display each students name, roll no, his semester, branch, his marks for each subject along with lecture name. If average marks is greater than 90, display grade.