Java Assignment 2

1. Write a simple program to implement hierarchical inheritance. Apply the concept of package.
2. Write a simple program to implement multilevel inheritance.
3. Write a program to implement the concept of multiple inheritance using interface.
4. Write a program to show that a superclass variable can reference a subclass object.
5. Write a program to show the following usage of super keyword, i.e., super can be used to invoke parent class method, super is used to invoke parent class constructor, super keyword can be used to access the data member or field of parent class.
6. Write a program to show the application of final variable for variable, method and class.
7. Write a program to implement dynamic method dispatch.
8. Let's consider the example of vehicles like bicycle, car, bike……, they have common functionalities. So we make an interface and put all these common functionalities. And lets Bicycle, Bike, car ….etc implement all these functionalities in their own class in their own way. Write a program to implement this.
9. Create a class called as clock which has three instance variables hours, minutes and seconds. It contains method called as add() which takes clock object as parameter and sets the data in the body and return the object. Now in main method create two clock objects and each one passes 3 arguments via parameterized constructor. Now create third object and this third object is assigned with adding the time values of each two objects
   Like hint : Clock c3 = c1.add(c2)
   Now after this print the addition of two time values
   Testcases :
   Time 1 : 5:23:12
   Time 2: 6:38:50
   Time after addition : 12:2:2
10. Create an interface called department containing attributes department name and number of faculty members, it also has an abstract method for printing the attributes. Create a class called hostel containing hostel name, number of rooms. The class contains the method to print the attributes. Now, create a student class extending hostel class and implementing the department interface. Student class contains attributes like student name, Roll Number, year of study, Home Town and a method to print the information Implement the abstract method of department interface in student class. Write a driver class to test the student class. The program should be menu driven containing the options:
    1. Admit the new student
    2. Migrate a student
    3. Display student information (details of student should be searched based on student registration number).
11. Create a class with a method that prints "This is parent class" and its subclass with another method that prints "This is child class". Now, create an object for each of the class and call
    1 - method of parent class by object of parent class
    2 - method of child class by object of child class
    3 - method of parent class by object of child class
12. In the above example, declare the method of the parent class as private and then repeat the first two operations (You will get error in the third).
13. Create a class named 'Member' having the following members:
    Data members
    1 - Name
    2 - Age
    3 - Phone number
    4 - Address
    5 - Salary
    It also has a method named 'printSalary' which prints the salary of the members. Two classes 'Employee' and 'Manager' inherits the 'Member' class. The 'Employee' and 'Manager' classes have data members 'specialization' and 'department' respectively. Now, assign name, age, phone number, address and salary to an employee and a manager by making an object of both of these classes and print the same.

14. Create a class named 'Rectangle' with two data members 'length' and 'breadth' and two methods to print the area and perimeter of the rectangle respectively. Its constructor having parameters for length and breadth is used to initialize length and breadth of the rectangle. Let class 'Square' inherit the 'Rectangle' class with its constructor having a parameter for its side (suppose s) calling the constructor of its parent class as 'super(s,s)'. Print the area and perimeter of a rectangle and a square.
15. Now repeat the above example to print the area of 10 squares.
    Hint-Use array of objects.
16. Create a class named 'Shape' with a method to print "This is This is shape". Then create two other classes named 'Rectangle', 'Circle' inheriting the Shape class, both having a method to print "This is rectangular shape" and "This is circular shape" respectively. Create a subclass 'Square' of 'Rectangle' having a method to print "Square is a rectangle". Now call the method of 'Shape' and 'Rectangle' class by the object of 'Square' class.
17. Write a Java Program to find the sum of multiple numbers using Method Overloading.
18. Write a program in Java to implement a calculator having four functions such addition, multiplication, division, and subtraction, where the four said functions are defined in four different packages. Inputs are user defined and use the concept of inheritance for the division operation.