**OBJECT ORIENTED PROGRAMMING**

**WEEK – V**

**WEEK-5: INHERITANCE**

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

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| **S.No** | **Problem Statement** |
| 1 | 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. |
| 2 | 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. |
| 3 | 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 |

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|  | classes and print the same. |
| 4 | Design three classes STUDENT ,EXAM and RESULT. The STUDENT class  has members such as rollno, name. create a class EXAM by inheriting the STUDENT class. The EXAM class adds datamembers representing the marks scored in six subjects. Derive the RESULT from the EXAM class and has its own members such as totalmarks. Write a Java program to model this relationship. |
| 5 | Create a base class basic\_info with data members name ,roll no, gender and two  member functions getdata and display. Derive a class physical\_fit from basic\_info which has data members height and weight and member functions getdata and display. Display all the information using object of derived class. |
| **6** | Write a java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method print Area () that prints the area of the given shape. |
| **7** | Create an abstract class 'Bank' with an abstract method 'getBalance'. $100,  $150 and $200 are deposited in banks A, B and C respectively. 'BankA', 'BankB' and 'BankC' are subclasses of class 'Bank', each having a method named 'getBalance'. Call this method by creating an object of each of the three classes |
| **8** | Create an abstract class 'Animals' with two abstract methods 'cats' and  'dogs'. Now create a class 'Cats' with a method 'cats' which prints "Cats meow" and a class 'Dogs' with a method 'dogs' which prints "Dogs bark", both inheriting the class 'Animals'. Now create an object for each of the subclasses and call their respective methods |
| **9** | An abstract class has a construtor which prints "This is constructor of  abstract class", an abstract method named 'a\_method' and a non-abstract method which prints "This is a normal method of abstract class". A class 'SubClass' inherits the abstract class and has a method named 'a\_method' which prints "This is abstract method". Now create an object of 'SubClass' and call the abstract method and the non-abstract method. (Analyse the result) |
| **10** | We have to calculate the percentage of marks obtained in three subjects (each out of 100) by student A and in four subjects (each out of 100) by student B. Create an abstract class 'Marks' with an abstract method 'getPercentage'. It is inherited by two other classes 'A' and 'B' each having a method with the same name which returns the percentage of the students. |

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|  | The constructor of student A takes the marks in three subjects as its parameters and the marks in four subjects as its parameters for student B. Create an object for each of the two classes and print the percentage of marks for both the students. |