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Sub: CA314: Object Oriented Programming through JAVA

Practical Assignment-6

Inheritance & Polymorphism

1. **Create person class with data members as person\_id & name.**

**Derive two classes Student & faculty from it. The fields of Student are course name & fees paid.**

**The fields of faculty are subject name & number of years experience.**

**Use proper method to accept values & Override display method.**

\*/

package cmpica;

import java.util.Scanner;

class person{

Scanner scan= new Scanner(System.in);

String Name;

public void GetData(){

System.out.println("Enter Your Name: ");

Name=scan.nextLine();

}

public void Display()

{

System.out.println("Person Name is: "+Name);

}

}

class Student extends person{

int Id,fees;

String Course;

public void GetData(){

System.out.println("Enter Your Student ID: ");

Id=Integer.parseInt(scan.nextLine());

System.out.println("Enter Your Fees: ");

fees=Integer.parseInt(scan.nextLine());

System.out.println("Enter Your Course Name: ");

Course=scan.nextLine();

}

public void Display()

{

System.out.println("Student ID is: "+Id);

System.out.println("Fees is: "+fees);

System.out.println("Course Name is: "+Course);

}

}

class Faculty extends person{

int f\_Id,no\_Exp;

String Subject;

public void GetData(){

System.out.println("Enter Your Faculty ID: ");

f\_Id=Integer.parseInt(scan.nextLine());

System.out.println("Enter Your Number of Year of Expierience: ");

no\_Exp=Integer.parseInt(scan.nextLine());

System.out.println("Enter Your Subject Name: ");

Subject=scan.nextLine();

}

public void Display()

{

System.out.println("Faculty ID is: "+f\_Id);

System.out.println("Number of Years of Experience is: "+no\_Exp);

System.out.println("Subject Name is: "+Subject);

}

}

public class Assignment6\_q1 {

public static void main(String[] args) {

person p=new person();

Student s= new Student();

Faculty f= new Faculty();

p.GetData();s.GetData();f.GetData();

System.out.println("\n");

p.Display();s.Display();f.Display();

}

}

/\*

1. **Create employee class with & employee number, name basic salary.**

**Create a class manager which is subclass of employee class, having fields department name & incentive.**

**Create another class sales\_manager which is subclass of manager class, having field commission.**

**Use constructor & write a method to calculate salary for all 3 classes.**

\*/

package cmpica;

import java.util.Scanner;

abstract class employee{

Scanner scan = new Scanner(System.in);

int emp\_num;

double basic\_salary;

String name;

public employee()

{

System.out.println("Enter Your Employee Number: ");

emp\_num=Integer.parseInt(scan.nextLine());

System.out.println("Enter Your Basic Salary: ");

basic\_salary=Double.parseDouble(scan.nextLine());

System.out.println("Enter Your Employee Name: ");

name=scan.nextLine();

}

abstract void Calculate\_Salary();

}

class Manager extends employee{

String department\_name;

double incentive;

public Manager()

{

System.out.println("Enter Your Department Name:");

department\_name=scan.nextLine();

System.out.println("Enter Your Incentive: ");

incentive=Double.parseDouble(scan.nextLine());

}

void Calculate\_Salary()

{

double salary=super.basic\_salary+incentive;

System.out.println("Salary of Manager is: "+salary);

}

}

class salesManager extends employee{

double commission;

public salesManager()

{

System.out.println("Enter Your commission: ");

commission=Double.parseDouble(scan.nextLine());

}

void Calculate\_Salary()

{

double salary=super.basic\_salary+commission;

System.out.println("Salary of Sales Manager is: "+salary);

}

}

public class Assignment6\_q2 {

public static void main(String[] args) {

salesManager m1=new salesManager();

Manager m2=new Manager();

m1.Calculate\_Salary();

m2.Calculate\_Salary();

}

}

/\*

**3.Create an abstract class Shape which consists of method area.**

**Create three subclasses Rectangle, Circle and Triangle and calculate area using method Overriding and achieve DMD**

\*/

package cmpica;

import java.util.Scanner;

import java.math.\*;

abstract class shape{

double side1, side2;

Scanner sc=new Scanner(System.in);

abstract void area();

}

class Rectangle extends shape{

void area()

{

System.out.println("Enter Value of Side 1: ");

side1=Double.parseDouble(sc.nextLine());

System.out.println("Enter Value of Side 2: ");

side2=Double.parseDouble(sc.nextLine());

double Area= side1\*side2;

System.out.println("Area of Rectangle is: "+Area);

}

}

class Circle extends shape{

void area()

{

System.out.println("Enter Value of radius: ");

side1=Double.parseDouble(sc.nextLine());

double Area= (3.14\*side1\*side1);

System.out.println("Area of Circle is: "+Area);

}

}

class Triangle extends shape{

void area()

{

System.out.println("Enter Value of Height: ");

side1=Double.parseDouble(sc.nextLine());

System.out.println("Enter Value of base: ");

side1=Double.parseDouble(sc.nextLine());

double Area= ((side1\*side1)/2);

System.out.println("Area of Circle is: "+Area);

}

}

public class Assignment6\_q3 {

public static void main(String[] args) {

shape s;

Rectangle r=new Rectangle();

Circle c=new Circle();

Triangle t= new Triangle();

s=r;

s.area();

s=c;

s.area();

s=t;

s.area();

}

}

/\*

**4. Create an abstract class Person. Derive two classes Employee and Worker from it.**

**Use proper method to accept and display the details for the same.**

**The fields of Employee are Emp\_no,Emp\_name and address.**

**Similar fields for worker are name and working hour.**

\*/

package cmpica;

abstract class Person{

void accept(){}

abstract void Display();

}

class Employee extends Person{

int Emp\_no;

String Emp\_name,address;

Employee()

{

Emp\_no=0;

Emp\_name=null;

address=null;

}

void Accept(int no, String name, String Address)

{

Emp\_no=no;

Emp\_name=name;

address=Address;

}

void Display()

{

System.out.println("Employee Number is: "+Emp\_no);

System.out.println("Employee Name is: "+Emp\_name);

System.out.println("Employee Address is: "+address);

}

}

class Worker extends Person {

int Work\_Hours;

String Name;

Worker()

{

Work\_Hours=0;

Name=null;

}

void Accept(String s,int h)

{

Work\_Hours=h;

Name=s;

}

void Display(){

System.out.println("Worker's Name: "+Name);

System.out.println("Working Hours: "+Work\_Hours);

}

}

public class Assignment6\_q4 {

public static void main(String args[])

{

Person p1;

Employee obj1=new Employee();

obj1.Accept(63, "Shivam", "Anand");

Worker obj2= new Worker();

obj2.Accept("Shivam", 9);

System.out.println("\nEmployee Details: ");

p1=obj1;

p1.Display();

System.out.println("\nWorker Details: ");

p1=obj2;

p1.Display();

}

}

/\*

**5. Define an Employee class with suitable attributes having getSalary() method,**

**which returns salary withdrawn by a particular employee.**

**Write a class Manager which extends a class Employee, override the getSalary () method,**

**which will return salary of manager by adding traveling allowance, house rent allowance etc.**

\*/

package cmpica;

import java.util.Scanner;

class Employee{

Scanner scan= new Scanner(System.in);

double salary;

double getSalary()

{

System.out.println("Enter Your Salary: ");

salary=Double.parseDouble(scan.nextLine());

return salary;

}

}

class manager extends Employee{

double travelling, house\_rent;

double getSalary()

{

super.getSalary();

System.out.println("Enter Travelling Allowances: ");

travelling=Double.parseDouble(scan.nextLine());

System.out.println("Enter House Rent Allowances: ");

house\_rent=Double.parseDouble(scan.nextLine());

super.salary=super.salary+travelling+house\_rent;

return salary;

}

}

public class Assignent6\_q5 {

public static void main(String[] args) {

manager m1= new manager();

System.out.println("Yor salary is: "+m1.getSalary());

}

}

/\*

**6. Declare an abstract class vehicle with an abstract method name numwheels().**

**Provide the two subclasses two-wheeler and four wheelers, each one of which implements this method.**

**Create instance of these two subclasses and demonstrate the use of numwheels() method.**

\*/

package cmpica;

abstract class vehicle{

abstract void number\_wheels();

}

class Twowheeler extends vehicle{

void number\_wheels()

{

System.out.println("This is Two Wheeler...");

}

}

class Fourwheeler extends vehicle{

void number\_wheels()

{

System.out.println("This is Four Wheeler...");

}

}

public class Assignment6\_q6 {

public static void main(String[] args) {

vehicle v;

Twowheeler obj=new Twowheeler();

Fourwheeler obj2=new Fourwheeler();

v=obj;

v.number\_wheels();

v=obj2;

v.number\_wheels();

}

}

/\*

7. Write a program to Design a Shape as an interface and then Design class for Rectangle,Triangle and Hexagon

which implements the interface and override method drawShape() and achieve DMD.

\*/

package cmpica;

interface Shape{

public void draw\_shape();

}

class rectangle implements Shape{

public void draw\_shape()

{

System.out.println("rectangle Drawn...");

}

}

class triangle implements Shape{

public void draw\_shape()

{

System.out.println("triangle Drawn...");

}

}

class Hexagon implements Shape{

public void draw\_shape()

{

System.out.println("Hexagon Drawn...");

}

}

public class Assignment6\_q7 {

public static void main(String[] args) {

rectangle r= new rectangle();

triangle t=new triangle();

Hexagon h=new Hexagon();

r.draw\_shape();

t.draw\_shape();

h.draw\_shape();

}

}

**/\***

**8. Write a program to create interface A in this interface we have two methods display () which will display variables of class**

**and print\_pattern() which will print pattern.**

**Implements this interface in another class named MyClass.**

\*/

package cmpica;

interface A{

int a=10;

void Display();

}

public class Assignment6\_8\_i{

}

package cmpica;

class B implements A{

public void Display()

{

System.out.println("Value of Variable is: "+a);

}

}

public class Assignment6\_8\_ii {

public static void main(String[] args) {

B b= new B();

b.Display();

}

}

/\*

**9. Write a program to find the area of Circle, Rectangle, Square using Runtime Polymorphism(DMD).**

\*/

package cmpica;

Class Area

{

void area(float x)

{

System.out.println("the area of the square is "+Math.pow(x, 2));

}

void area(float x, float y)

{

System.out.println("the area of the rectangle is "+x\*y);

}

void area(double x)

{

double z = 3.14 \* x \* x;

System.out.println("the area of the circle is "+z);

}

}

public class Assignment6\_q9 {

public static void main(String args[])

{

Area a = new Area();

a.area(5);

a.area(11,12);

a.area(2.5);

}

}