**TEST 3**

1. Implement a ComplexNumber class that supports various operations like addition and multiplication. Use method overloading to provide different ways to perform these operations.

**PROGRAM**

public class operations

{

static public class complexnumbers

{

int a,b,c;

public void operation(int a,int b)

{

this.a=a;

this.b=b;

System.out.println("The Sum Of Two Numbers Is:-"+(a+b));

}

public void operation(int a,int b,int c)

{

this.a=a;

this.b=b;

this.c=c;

System.out.println("The Multiplication Of Three Numbers Is:-"+(a\*b\*c));

}

public static void main(String[] args)

{

complexnumbers op=new complexnumbers();

op.operation(3,5);

op.operation(4,5,6);

}

    }

}

1. Create an abstract Shape class with an abstract method area(). Implement subclasses Circle, Rectangle, and Triangle, each overriding the area() method to calculate the area specific to the shape. Additionally, provide overloaded constructors for each subclass to handle different input types for the shape dimensions.

**PROGRAM**

import java .util.Scanner;

public class area

{

static public class Shape

{

Scanner scanner=new Scanner(System.in);

public void area()

{

System.out.println("Finding The Area For Shapes");

}

public void perimeter()

{

System.out.println("Finding Perimeter For Shapes");

}

}

static class Rectangle extends Shape

{

int length,breadth,area;

public void area()

{

System.out.print("Enter The Length Of The Rectangle:-");

length=scanner.nextInt();

scanner.nextLine();

System.out.print("Enter The Breadth Of The Rectangle:-");

breadth=scanner.nextInt();

scanner.nextLine();

area=length\*breadth;

System.out.println("The Area Of The Rectangle Is:-"+area);

}

public void perimeter()

{

System.out.println("The Perimeter Of The Rectangle Is:-"+2\*(length+breadth));

}

}

static class Triangle extends Shape

{

int base,height;

public void area()

{

System.out.print("Enter The Base Of The Triangle:-");

base=scanner.nextInt();

scanner.nextLine();

System.out.print("Enter The Height Of The Triangle:-");

height=scanner.nextInt();

scanner.nextLine();

int area=(base\*height)/2;

System.out.println("The Area Of The Triangle Is:-"+area);

}

public void perimeter()

{

System.out.println("The Perimeter Of The Triangle Is:-"+(base+height+height));

}

}

public static void main(String[] args)

{

Shape sp=new Shape();

Shape rct=new Rectangle();

Shape tri=new Triangle();

rct.area();

rct.perimeter();

tri.area();

tri.perimeter();

}

}

1. Create a class hierarchy for an educational institution. The base class Member should have subclasses Student, Teacher, and Staff. Each subclass should implement a method getDetails() to provide specific details and attributes relevant to the member type.

**PROGRAM**

import java.util.Scanner;

public class institution {

static class Institution

{

Scanner scanner=new Scanner(System.in);

String name;

int id,age;

public void getinfo(){}

public void putinfo(){}

}

static class Student extends Institution

{

public void getinfo()

{

System.out.print("Enter The Student Name:-");

name=scanner.nextLine();

System.out.print("Enter the Student Age:-");

age=scanner.nextInt();

scanner.nextLine();

System.out.print("Enter The Student Register Number:-");

id=scanner.nextInt();

scanner.nextLine();

}

public void putinfo()

{

System.out.println("Student Name:-"+name);

System.out.println("Student Age:-"+age);

System.out.println("Student RegNo:-"+id);

}

}

static class Teacher extends Institution

{

public void getinfo()

{

System.out.print("Enter The Teacher Name:-");

name=scanner.nextLine();

System.out.print("Enter the Teacher Age:-");

age=scanner.nextInt();

scanner.nextLine();

System.out.print("Enter The Teacher Register Number:-");

id=scanner.nextInt();

scanner.nextLine();

}

public void putinfo()

{

System.out.println("Teacher Name:-"+name);

System.out.println("Teacher Age:-"+age);

System.out.println("Teacher RegNo:-"+id);

}

}

static class Staff extends Institution

{

public void getinfo()

{

System.out.print("Enter The Staff Name:-");

name=scanner.nextLine();

System.out.print("Enter the Staff Age:-");

age=scanner.nextInt();

scanner.nextLine();

System.out.print("Enter The Staff Register Number:-");

id=scanner.nextInt();

scanner.nextLine();

}

public void putinfo()

{

System.out.println("Staff Name:-"+name);

System.out.println("Staff Age:-"+age);

System.out.println("Staff RegNo:-"+id);

}

}

public static void main(String[] args) {

Institution inst=new Institution();

Institution std=new Student();

Institution tch=new Teacher();

Institution stf=new Staff();

std.getinfo();

tch.getinfo();

stf.getinfo();

std.putinfo();

tch.putinfo();

stf.putinfo();

}

}

1. Design a File class with subclasses TextFile, ImageFile, and VideoFile. Implement methods open(), close(), and getInfo(). Each subclass should override these methods to provide specific functionalities and attributes like resolution for ImageFile and duration for VideoFile.

**PROGRAM**

import java.util.Scanner;

public class filemain

{

static class file{

String name;

Scanner scanner=new Scanner(System.in);

public void open()

{

System.out.println("Opening The Main File");

}

public void close()

{

System.out.println("Closing The Main File");

}

public void getinfo()

{

System.out.println("The File Name Is:-"+name);

}

}

static class Textfile extends file{

public Textfile()

{

System.out.print("Enter The TextFile Name:-");

name=scanner.nextLine();

}

public void open()

{

System.out.println("Opening The Text File");

}

public void close()

{

System.out.println("Closing The Text File");

}

public void getinfo()

{

System.out.println("The TextFile Name Is:-"+name);

}

}

static class Imagefile extends file{

public Imagefile()

{

System.out.print("Enter The ImageFile Name:-");

name=scanner.nextLine();

}

public void open()

{

System.out.println("Opening The Image File");

}

public void close()

{

System.out.println("Closing The Image File");

}

public void getinfo()

{

System.out.println("The Image File Name Is:-"+name);

}

}

static class Videofile extends file{

public Videofile()

{

System.out.print("Enter The Video File NAme:-");

name=scanner.nextLine();

}

public void open()

{

System.out.println("Opening The Video File");

}

public void close()

{

System.out.println("Closing The Video File");

}

public void getinfo()

{

System.out.println("The Video File Name Is:-"+name);

}

}

public static void main(String[] args)

{

file fl=new file();

file txt=new Textfile();

file img=new Imagefile();

file vid=new Videofile();

txt.getinfo();

img.getinfo();

vid.getinfo();

}

}