# **Experiment 2**

1. **Write a program to print the area of a rectangle by creating a class named 'Area' having two methods. First method named as 'setDim' takes length and breadth of rectangle as parameters and the second method named as 'getArea' returns the area of the rectangle. Length and breadth of rectangle are entered through keyboard.**

# **Program**:

import java.util.Scanner;

class Area{

    private double length;

    private double breadth;

    public void setDim(double length ,double breadth){

        this.length=length;

        this.breadth=breadth;

    }

    public double getArea (){

        return length\*breadth;

    }

}

class main{

    public static void main (String  args[]){

       Scanner sc = new Scanner (System.in);

       Area rectangle=new Area();

        System.out.println("Enter length of rectangle");

        double length =sc.nextDouble();

        System.out.println("Enter breadth of rectangle:");

        double breadth = sc.nextDouble();

        rectangle.setDim(length,breadth);

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

        sc.close();

    }

}

# **Output**:

Enter length of rectangle

7

Enter breadth of rectangle:

5

Area of rectangle is:35.0

1. **Create a class named 'Student' with String variable 'name' and integer variable 'roll\_no'. Assign the value of roll\_no as '2' and that of name as "John" by creating an object of the class Student.**

# **Program**:

/\* 2.

Create a class named 'Student' with String variable 'name' and integer variable 'roll\_no'.

 Assign the value of roll\_no as '2' and that of name as "John" by creating an object of the class Student.

\*/

import java.util.Scanner;

class Student { // Class name should start with uppercase

    private String name;

    private int rollNo; // Consistent variable naming (camelCase)

    public Student(String name, int rollNo) { // Constructor to initialize

        this.name = name;

        this.rollNo = rollNo;

    }

    public String getName() {

        return name;

    }

    public int getRollNo() {

        return rollNo;

    }

}

public class Exp2\_2 { // Class name should start with uppercase

    public static void main(String[] args) {

        Scanner sc = new Scanner(System.in);  // Correct object creation for Scanner

        Student prathmesh = new Student("John", 2); // Create Student object

        // No need to call student() within main (it's a constructor)

        System.out.println("Student Name: " + prathmesh.getName());

        System.out.println("Student Roll Number: " + prathmesh.getRollNo());

        sc.close();

    }

}

# **Output:**

Student Name: John

Student Roll Number: 2

1. **Assign and print the roll number, phone number and address of two students having names "Sam" and "John" respectively by creating two objects of class 'Student'.**

# **Program**:

import java.util.Scanner;

class Student{

    String name,address;

    int roll\_no;

    double phone\_no;

    public void get\_info(){

        Scanner sc= new Scanner(System.in);

        System.out.println("Enter name:");

        name=sc.nextLine();

        System.out.println("Enter roll number");

        roll\_no=sc.nextInt();

        System.out.println("Enter phone number:");

        phone\_no= sc.nextDouble();

        sc.nextLine();

        System.out.println("Enter address :");

        address=sc.nextLine();

    }

    public void display(){

        System.out.println("");

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

        System.out.println("Roll Number:"+roll\_no);

        System.out.println("Phone Number:"+phone\_no);

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

    }

}

public class student\_Info {

    public static void main(String args[])  {

        Student s1= new Student();

        Student s2= new Student();

        s1.get\_info();

        s2.get\_info();

        s1.display();

        s2.display();

    }

}

# **Output:**

Enter name:

Sam

Enter roll number

2078

Enter phone number:

8767173285

Enter address :

Ozarde

Enter name:

John

Enter roll number

2000

Enter phone number:

9876543210

Enter address :

Ashta

Name:Sam

Roll Number:2078

Phone Number:8.767173285E9

Address:Ozarde

Name:John

Roll Number:2000

Phone Number:9.87654321E9

Address:Ashta

1. **Write a program to print the area and perimeter of a triangle having sides of 3, 4 and 5 units by creating a class named 'Triangle' without any parameter in its constructor.**

# **Program**:

public class main {

    public static void main (String args[]){

        Triangle t1=new Triangle();

        t1.Area();

        t1.perimeter();

    }

}

class Triangle{

    double area;

    double a=3,b=4,c=5;

    double s = (a + b + c) / 2.0 ;

    public void Area(){

        area = Math.sqrt(s\*(s - a)\*(s - b)\*(s - c));

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

    }

    public void perimeter(){

        double peri;

        peri=a+b+c;

        System.out.println("Perimeter of triangle is:"+peri);

    }

}

# **Output:**

Area of triangle is:6.0

Perimeter of triangle is:12.0

1. **Write a program to print the area and perimeter of a triangle having sides of 3, 4 and 5 units by creating a class named 'Triangle' with constructor having the three sides as its parameters.**

# **Program**:

public class exp2\_5 {

    public static void main(String args[]){

        Triangle t1=new Triangle(3, 4, 5);

        t1.getArea();

        t1.perimeter();

    }

}

class Triangle{

    double  a,b,c;

    public Triangle(int a, int b, int c){

        this.a=a;

        this.b=b;

        this.c=c;

    }

    public void getArea(){

        double s = (a + b + c) / 2.0 ;

       double area = Math.sqrt(s\*(s - a)\*(s - b)\*(s - c));

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

    }

    public void perimeter(){

        double peri;

        peri=a+b+c;

        System.out.println("Perimeter of triangle is:"+peri);

    }

}

# **Output:**

Area of triangle is:6.0

Perimeter of triangle is:12.0

1. **Write a program to print the area of two rectangles having sides (4,5) and (5,8) respectively by creating a class named 'Rectangle' with a method named 'Area' which returns the area and length and breadth passed as parameters to its constructor.**

# **Program**:

class Rectangle{

    double length,breadth;

    public Rectangle(double length, double breadth){

        this.length=length;   // Assigning parameter length to class variable

        this.breadth=breadth;  // Assigning parameter breadth to class variable

    }

    public double Area(){

        return length\*breadth;

    }

}

public class exp2\_6 {

    public static void main(String args[]){

        Rectangle r1=new Rectangle(4, 5);

        Rectangle r2=new Rectangle(5, 8);

        System.out.println("Area of rectangle(4,5):"+r1.Area());

        System.out.println("Area of rectangle(5,8):"+r2.Area());

    }

}

# **Output:**

Area of rectangle(4,5):20.0

Area of rectangle(5,8):40.0

1. **Write a program to print the area of a rectangle by creating a class named 'Area' taking the values of its length and breadth as parameters of its constructor and having a method named 'returnArea' which returns the area of the rectangle. Length and breadth of rectangle are entered through keyboard.**

# **Program**:

import java.util.Scanner;

public class exp2\_7 {

    public static void main(String args[]){

        Scanner sc=new Scanner(System.in);

        System.out.println("Enter length of rectangle:");

        double length=sc.nextDouble();

        System.out.println("Enter breadth of rectangle:");

        double breadth=sc.nextDouble();

        Area a1=new Area(length,breadth);

        System.out.println("Area of rectangle is:"+a1.returnArea());

    }

}

class Area{

    double length,breadth;

    public Area(double length,double breadth){

        this.length=length;

        this.breadth=breadth;

    }

    public double returnArea(){

        return length\*breadth;

    }

}

# **Output:**

Enter length of rectangle:

10

Enter breadth of rectangle:

8

Area of rectangle is:80.0

1. **Print the average of three numbers entered by user by creating a class named 'Average' having a method to calculate and print the average.**

# **Program**:

import java.util.Scanner;

public class exp2\_8 {

    public static void main(String args[]){

        Scanner sc= new Scanner(System.in);

        System.out.println("Enter First Number");

        int a=sc.nextInt();

        System.out.println("Enter second Number");

        int b=sc.nextInt();

        System.out.println("Enter third Number");

        int c=sc.nextInt();

        Average a1=new Average(a,b,c);

        a1.printAverage();

    }

}

class Average{

    int a,b,c;

    public Average(int a,int b, int c ){

        this.a=a;

        this.b=b;

        this.c=c;

    }

    public void printAverage(){

        System.out.println("Average of three numbers is:"+((a+b+c)/3));

    }

}

# **Output:**

Enter First Number

8

Enter second Number

9

Enter third Number

10

Average of three numbers is:9

1. **Print the sum, difference and product of two complex numbers by creating a class named 'Complex' with separate methods for each operation whose real and imaginary parts are entered by user**.

# **Program**:

 import java.util.Scanner;

 class Complex{

    double a,b,c,d;

    public Complex(double a, double b, double c,double d){

        this.a=a;

        this.b=b;

        this.c=c;

        this.d=d;

    }

    public void printSum(){

        double real\_sum=a+c;

        double img\_sum=b+d;

        System.out.println("Sum: ("+a+"+ i"+b+") + ("+c+"+ i"+d+") = ("+real\_sum+"+ i"+img\_sum+")");

    }

    public void difference(){

        double real\_diff=a-c;

        double img\_diff=b-d;

        System.out.println("Difference: ("+a+"+ i"+b+") -  ("+c+"+ i"+d+") = ("+real\_diff+"+i"+img\_diff+")");

    }

    public void product(){

        double real\_product= (a\*c-b\*d); // (a + ib)\*(c + id) = (ac - bd) + i(ad + bc).

        double img\_product=(a\*d+b\*c);

        System.out.println("Product: ("+a+"+ i"+b+") \* ("+c+"+ i"+d+")= ("+real\_product+"+i"+img\_product+")");

    }

 }

 public class exp2\_9 {

    public static void main(String args[]){

        Scanner sc=new Scanner(System.in);

        System.out.println("Enter first complex number");

        System.out.println("Enter real part:");

        double a=sc.nextDouble();

        System.out.println("Enter imaginary part:");

        double b=sc.nextDouble();

        System.out.println("Enter second complex number");

        System.out.println("Enter real part:");

        double c=sc.nextDouble();

        System.out.println("Enter imaginary part:");

        double d=sc.nextDouble();

        Complex c1=new Complex(a,b,c,d);

        c1.printSum();

        c1.difference();

        c1.product();

        sc.close();

    }

}

# **Output:**

Enter real part:

9

Enter imaginary part:

6

Enter second complex number

Enter real part:

5

Enter imaginary part:

7

Sum: (9.0+ i6.0) + (5.0+ i7.0) = (14.0+ i13.0)

Difference: (9.0+ i6.0) - (5.0+ i7.0) = (4.0+i-1.0)

Product: (9.0+ i6.0) \* (5.0+ i7.0)= (3.0+i93.0)

1. **Write a program that would print the information (name, year of joining, salary, address) of three employees by creating a class named 'Employee'. The output should be as follows:  
   Name        Year of joining        Address  
   Robert            1994                64C- WallsStreat  
   Sam                2000                68D- WallsStreat  
   John                1999                26B- WallsStreat**

# **Program**:

 class Employee{

    String name;

    int join\_year;

    long salary;

    String address;

    public Employee(String name,int join\_year,long salary,String address){

        this.name=name;

        this.join\_year=join\_year;

        this.salary=salary;

        this.address=address;

    }

    public void display\_info(){

        System.out.println("\t"+name+"\t"+join\_year+"\t"+salary+"\t"+address);

    }

 }

 public class exp2\_10 {

    public static void main(String args[]){

        Employee e1=new Employee("Robert",1994,80000,"64C- WallsStreat");

        Employee e2=new Employee("Sam",2000,81000,"68D- WallsStreat");

        Employee e3=new Employee("John",1999,82000,"26B- WallsStreat");

        System.out.println("\tName\tJYear\tSalary\tAddress");

        e1.display\_info();

        e2.display\_info();

        e3.display\_info();

    }

}

# **Output:**

Name JYear Salary Address

Robert 1994 80000 64C- WallsStreat

Sam 2000 81000 68D- WallsStreat

John 1999 82000 26B- WallsStreat

1. **Design a Book class: Attributes: title, author, ISBN**

**Methods: getTitle(), getAuthor(), getISBN(), toString() (to print book details)**

# **Program**:

/\* 11.   Design a Book class: Attributes: title, author, ISBN

Methods: getTitle(), getAuthor(), getISBN(), toString() (to print book details)

 \*/

 import java.util.Scanner;

class Book{

    String title;

    String author;

    String ISBN;

    Scanner sc=new Scanner(System.in);

    // this is constructor

    // public Book(String title, String author, String ISBN){

    //     this.title=title;

    //     this.author=author;

    //     thi s.ISBN=ISBN;

    // }

    public void getTitle(){

        System.out.println("Enter title of book:");

        title=sc.nextLine();

    }

    public void getAuthor(){

        System.out.println("Enter Author name of book:");

        author=sc.nextLine();

    }

    public void getISBN(){

        System.out.println("Enter ISBN of book:");

        ISBN=sc.nextLine();

    }

    @Override // not necessary to write

    // toString() returns string

    public String toString() {

        return "-------Book Details-------" +

                "\nTitle: " + title +

                "\nAuthor: " + author +

                "\nISBN: " + ISBN;

    }

}

 public class exp2\_11 {

    public static void main(String args[]){

        Book b1=new Book();

        b1.getTitle();

        b1.getAuthor();

        b1.getISBN();

        b1.toString();

        System.out.println(b1.toString());

    }

}

# **Output:**

Enter title of book:

Can't Hurt Me

Enter Author name of book:

David Goggins

Enter ISBN of book:

prath\_1022031066

-------Book Details-------

Title: Can't Hurt Me

Author: David Goggins

ISBN: prath\_1022031066

1. **Model a Student class: Attributes: name, roll number, marks (array)**

**Methods: getAverageMarks(), getHighestMark()**

# **Program**:

 import java.util.Scanner;

class Student{

    String name;

    int roll\_num;

    double[] marks = new double[5]; // Initialize marks array

    double total;

    double max=marks[0];

    Scanner sc=new Scanner(System.in);

    public void get\_info(){

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

        name=sc.nextLine();

        System.out.println("Enter Roll Number:");

        roll\_num=sc.nextInt();

    }

    public void getMarks(){

        System.out.println("Enter marks of 5 subjects:");

        for(int i=0; i<5; i++){

            marks[i]=sc.nextDouble();

        }

    }

    public void getAverageMarks(){

        for(int i=0; i<5; i++){

         total+=marks[i];

        }

        System.out.println("Average Marks:"+(total/5));

    }

    public void getHighestMark(){

        for(int i=0; i<5; i++){

            if(max<marks[i]){

                max=marks[i];

            }

        }

System.out.println("Highest Marks: " + max);

    }

}

 public class exp2\_12 {

    public static void main(String args[]){

        Student s1=new Student();

        s1.get\_info();

        s1.getMarks();

        s1.getAverageMarks();

        s1.getHighestMark();

    }

}

# **Output:**

Enter Name:

Prathmesh Patil

Enter Roll Number:

2078

Enter marks of 5 subjects:

89

80

99

98

97

Average Marks:92.6

Highest Marks: 99.0

1. **Encapsulation and Data Hiding:**

* **Design a class BankAccount with attributes like accountNumber, balance, and ownerName. Make balance private and provide public methods like deposit, withdraw, and getBalance to access and modify it while maintaining data integrity.**

# **Program**:

import java.util.Scanner;

class BankAccount{

    String ownerName;

    long accountNumber;

    long balance;

    Scanner sc=new Scanner(System.in);

    public BankAccount(String ownerName, long accountNumber, long balance){

        this.ownerName=ownerName;

        this.accountNumber=accountNumber;

        this.balance=balance;

    }

    public void deposit(){

        System.out.println("Enter Amount you want to deposit");

        long deposit\_amount=sc.nextLong();

        balance=balance+deposit\_amount;

        System.out.println("Amount deposited succesfully");

    }

    public void withdraw(){

        System.out.println("Enter Amount you want to Withdraw");

        long withdraw\_amount=sc.nextLong();

        balance=balance-withdraw\_amount;

        System.out.println("Amount withdraw succesfully");

    }

    public void getBalance(){

        System.out.println("Current Balance:"+balance);

    }

    public void display\_account\_details(){

        System.out.println("\nOwner Name:"+ownerName);

        System.out.println("Account Number:"+accountNumber);

        System.out.println("Balance:"+balance);

    }

}

 public class exp2\_13 {

    public static void main(String args[]){

        Scanner sc=new Scanner(System.in);

        BankAccount b1=new BankAccount("Prathmesh", 1022031066, 6300);

        int choice;

        do{

        System.out.println("Enter choice");

        System.out.println("\n1.Deposit\n2.Withdraw\n3.Check Balance\n4.Display Account Details\n5.Exit");

        choice=sc.nextInt();

        switch (choice) {

            case 1:

            b1.deposit();

            b1.getBalance();

                break;

            case 2:

                b1.withdraw();

                b1.getBalance();

            case 3:

                b1.getBalance();

                break;

            case 4:

                b1.display\_account\_details();

                break;

            default:

                break;

        }

    }while(choice!=5);

    }

}

# **Output:**

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

4

Owner Name:Prathmesh

Account Number:1022031066

Balance:6300

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

5

PS C:\Users\junio\pull from github\Java\Experiment 2> cd "c:\Users\junio\pull from github\Java\Experiment 2\" ; if ($?) { javac exp2\_13.java } ; if ($?) { java exp2\_13 }

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

4

Owner Name:Prathmesh

Account Number:1022031066

Balance:6300

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

1

Enter Amount you want to deposit

300

Amount deposited succesfully

Current Balance:6600

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

2

Enter Amount you want to deposit

200

Amount withdraw succesfully

Current Balance:6400

Current Balance:6400

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

3

Current Balance:6400

Enter choice

1.Deposit

2.Withdraw

3.Check Balance

4.Display Account Details

5.Exit

5