Experiment No: 1

AIM: Create a class student use data members as id, name. Create a constructor to initialize. Create 2 instances of the same class to initialize the data as well as to display the data (use another function display()) to be defined in the class.

CO1: Understand Object-oriented concepts and design classes and objects to solve problems.

PROGRAM:
```
class Student
{
    int id;
    string name;
    Student (int i, string n)
    {
     id = i;
     name = n;
    }
    void display ()
    {
        System.out.println (id+" "+name);
    }
public static void main(string args[])
    {
        Student s1 = new student (111, "kiran");
        Student s2 = new student (222, "Midun");
        s1.display ();
        s2. display ();
    }
}
```

OUTPUT:

111   kiran
222   Midhun

RESULT:
Program executed successfully and the output is
varified.

Experiment No: 2.

AIM: Define a class 'products' with data members prcode, pname and price. Create 3 objects of the class and find the product having the lowest price.

CO : Understand Object-oriented concepts and design classes and objects to solve problems.

PROGRAM:

```
class products
{
    int prode, price;
    String pname;
    product (int i, int p, String n)
    {
        prode = i;
        pname = n;
        price = p;
    }
    void display()
    {
        System.out.println (prode+ " "+pname+" "+price);
    }
public static void main(String args[])
    {
        products p1 = new products(10, 250, "chair");
        products p2 = new products(11, 300, "stool");
        products p3 = new products(12, 100, "lock");
        p1.display();
        p2.display();
```

```java
        p3.display();

        if (p1.price<p2.price  && p1.price<p3.price)
        {
            System.out.println ("chair has the lowest price");
        }
        else if (p2.price<p1.price && p2.price<p3.price)
        {
            System.Out.println ("stool has the lowest price");
        }
        else
        {
            System.out.println (p3.pname+ "has the lowest price");
        }
    }
}
```

OUTPUT:

```
10   chair   250
11   stool   300
12   lock    100
lock has the lowest price.
```

Result:
Program executed successfully and the output is
varified.

Experiment No: 3

AIM: Add 2 complex numbers.

CO1: Understand object-oriented concepts and design classes and objects to solve problems.

PROGRAM:

```
class complex
{
    int real;
    int imaginary;
    complex (int real, int imaginary)
    {
        this.real = real;
        this.imaginary = imaginary;
    }
    complex add (complex other)
    {
        int realsum = this.real + other.real;
        int imaginarysum = this.imaginary + other.imaginary;
        return new complex (realsum, imaginarysum);
    }
    public static void main (String[] args)
    {
        complex num1 = new complex (3, 2);
        complex num2 = new complex (1, 4);
        complex sum = num1.add (num2);
        System.out.println ("sum: " + sum.getReal() +
                          " + " + sum.getImaginary() + "i");
    }
}
```

```
public double getReal()
{
    return real;
}
public double getImaginary()
{
    return imaginary();
}
}
```

Output:

Sum: 4.0 + 6.0i

Result:
Program executed successfully and the output is verified.

Experiment No : 4

AIM: Add 2 Matrices using scanner.

CO1: Understand object-oriented concepts and design classes and objects to solve problems.

PROGRAM:

```java
import java.util.Scanner;
public class Add_Matrix
{
    public static void main (String[] args)
    {
        int p,q, m,n;
        Scanner s = new Scanner (System in);
        System.out.print ("Enter no: of rows in 1st matrix:");
        p = s.nextInt();
        System.out.print("Enter no of columns in 1st matrix:");
        q = s.nextInt();
        System.out.print("Enter no of rows in 2nd matrix:");
        m = s.nextInt();
        System.out.print("Enter no of colums in 2nd matrix:");
        n = s.nextInt();
        if (p==m && q==n)
        {
            int a[][] = new int[p][q];
            int b[][] = new int[m][n];
            int c[][] = new int[m][n];
            System.out.println("Enter the elements of 1st matrix")
            for (int i=0; i<p; i++)
            {
                for (int j=0; j<q; i++)
```

```java
        {
            a[i][j] = s.nextInt();
        }
    }
}
System.out.println("Enter the elements in 2nd matrix:");
for (int i = 0; i < m; i++)
{
    for (int j = 0; j < n; j++)
    {
        b[i][j] = s.nextInt();
    }
}
for (int i = 0; i < p; i++)
{
    for (int j = 0; j < n; j++)
    {
        for (int k = 0; k < q; k++)
        {
            c[i][j] = a[i][j] + b[i][j];
        }
    }
}
System.out.println("Matrix after addition:");
for (int i = 0; i < p; i++)
{
    for (int j = 0; j < n; j++)
    {
        System.out.print(c[i][j] + " ");
    }
    System.out.println(" ");
}
}
```

```
            clse
            {
                System.out.println ("Addition not possible");
            }
        }
    }
}
```

Output:

```
Enter no: of rows in 1st matrix : 2
Enter no: of colums in 1st matrix : 2
Enter no: of rows in 2nd matrix : 2
Enter no: of colums in 2nd matrix: 2
Enter all the elements in 1st matrix:
1   2
3   4
Enter elements in 2nd matrix:
5   6
7   8
Matrix after addition:
6   8
10  12
```

Result:
Program executed successfully and the output is varified.

Experiment No: 5

AIM: Program to create a class for employ having attributes eNo, eName, eSalary. Read n employes information and search for an employ given eNo. using the concept of array of objects.

CO1:

PROGRAM:
```java
import java.util.Scanner;
public class Employ
{
    int eNO;
    String eName;
    double eSalary;
    public void getdetails ()
    {
        System.out.println ("\n Enter the employ details");
        Scanner sc = new Scanner(System.in);
        System.out.println ("Employ number:");
        eNo = sc.nextInt ();
        System.out.println ("Name:");
        sc.nextLine ();
        eName = sc.nextLine ();
        System.out.println ("Salary:");
        eSalary = sc.nextDouble ();
    }
    void display ()
    {
        System.out.println ("Employ No: " +eNo);
```

```java
        System.out.println("Name:" + eName);
        System.out.println("Salary:" + eSalary);
    }

    public static void main(String[] args)
    {
        System.out.println("\n Enter the no. of emplays");
        Scanner scl = new Scanner(System.in);
        int num = scl.nextInt();
        Employ arr[] = new Employ[num];
        for(int i=0; i<num; i++)
        {
            arr[i] = new Employ();
            arr[i].getdetails();
        }
        System.out.println("Information of all employe");
        for(int i=0; i<num; i++)
        {
            arr[i].display();
        }
        boolean state = false;
        System.out.println("\n Enter the employ no: for
                            details");
        int num2 = scl.nextInt();
        for(int i=0; i<num; i++)
        {
            if(arr[i].eNo == num2)
            {
                System.out.println("Employ details");
                arr[i].display();
            }
        }
    }
}
```

Output:
Enter the no. of employs
3.

Enter the employ details
Employ number:
101
Name:
roy
Salary:
3000

Enter the employ details.
Employ number:
102
Name:
riya
Salary:
4000

Enter the employ details.
Employ number:
103
Name:
reeju
Salary:
3500.

Information of all employs.
Employ No: 101
Name : roy
Salary: 3000.0

Employ No: 102
Name : riya
Salary : 4000.0
Employ No: 103
Name : reeju
Salary: 3500.0.

Enter the employ no: for details.
102
Employ details.
Employ No: 102.
Name : riya.
Salary : 4000.0.

Result:
Program executed successfully and the output is
varified.

Experiment no: 6.

AIM: Create a class with data members name, gender, address, age and a constructor to initialize the data members and another class employ that inherits the properties of class person and also contains its own data members like empid, company_name, qualification salary and its own constructor. Create another class 'teacher' that inherits the properties of class employ contain subject, department, teacher id. Use array of objects to display details of n teachers.

CO :

PROGRAM:
```java
import java.util.Scanner;
class Person
{
    String Name, Gender, Address;
    int Age;
    Person(String name, String gender, String addres,
            int age).
    {
        this.Name = name;
        this.Gender = gender;
        this.Address = address;
        this.Age = age;
    }
}
```

```java
class Employ extends Person
{
    int Empid;
    String Company_name, Qualification;
    long Salary;

    Employ (String name, String gender, String address,
            int age, int empid, String company_name,
            String qualification, long salary)
    {
        super (name, gender, address, age);
        this. Empid = empid;
        this. Company_name = company_name;
        this. Qualification = qualification;
        this. Salary = salary;
    }
}

public class Teacher extends Employ
{
    String Subject, Department, Teacherid;
    Teacher (String name, String gender, String address,
             int age, int empid, String company_name,
             String qualification, long salary, String subject,
             String department, String teacherid)
    {
        super (name, gender, address, age, empid, company_name,
               qualification, salary);
        this. subject = subject;
        this. Department = department;
        this. Teacherid = teacherid;
    }
}
```

```java
void display()
{
    System.out.println("Name : " + Name);
    System.out.println("Gender: " + Gender);
    System.out.println("Address: " + Address);
    System.out.println("Age : " + Age);
    System.out.println("Employ id : " + Empid);
    System.out.println("Company name: " + Company_name);
    System.out.println("Qualification: " + Qualification);
    System.out.println("Salary: " + Salary);
    System.out.println("Subject: " + Subject);
    System.out.println("Department:" + Department);
    System.out.println("Teacher id: " + Teacherid);
}

public static void main(String[] args)
{
    System.out.println("\n Enter the no: of Teachers");
    Scanner sc1 = new Scanner(System.in);
    int num = sc1.nextInt();
    Teacher arr[] = new Teacher[num];
    System.out.println("\n Enter the teacher details");
    int x=0, j=0;
    Scanner sc = new Scanner(System.in);
    for (int i=0; i<num; i++)
    {
        x = i + i;
        System.out.println("\n" + x + ")");
        System.out.println("\n Name: ");
        String a = sc.next();
        System.out.println("\n Gender:");
        String b = sc.next();
        System.out.println("\n Address:");
```

```java
String c = sc.next();
System.out.println("\n Age:");
int d = sc.nextInt();
System.out.println("\n Employ id:");
int e = sc.nextInt();
System.out.println("\n Company name:");
String f = sc.next();
System.out.println("\n Qualification:");
String g = sc.next();
System.out.println("\n Salary:");
long h = sc.nextLong();
System.out.println("\n Subject:");
String k = sc.next();
System.out.println("\n Department:");
String l = sc.next();
System.out.println("\n Teacher id:");
String n = sc.next();
arr[i] = new Teacher(a,b,c,d,e,f,g,h,k,l,n);
}
sc.close();
System.out.println("\n Information of all teachers");
for (int i=0; i<num; i++)
{
    j=i+1;
    System.out.println("\n"+j+". ");
    arr[i].display();
}
scl.close();
}
}
```

Output:

Enter the nor of Teachers : 2

Enter the teacher details

0) Name: anu
   Gender: female.
   Address: pala.
   Age : 21
   Employ id : 101
   Company name: school.
   Qualification : phd
   Salary : 20000
   Subject : Maths.
   Department : Maths.
   Teacher id : T20

2) Name : sinu.
   Gender : Male
   Address : ktm.
   Age : 29
   Employ id : 102
   Company name: school
   Qualification: mphil
   Salary : 20000
   Subject : physics.
   Department: physics
   Teacher id : T 30.

Information of all teachers
1) Name: anu
   Gender: female
   Address: pala.
   Age : 21

Employ id : 101
Company name : school
Qualification : phd.
Salary : 20000
Subject : Maths
Department : Maths
Teacher id : T20.

2) Name : Sinu
Gender : Male
Address : ktm
Age : 29.
Employ id : 102
Company name : school.
Qualification : mphil
Salary : 20000
Subject : physics.
Department : physics.
Teacher id : T30

Result :
The program executed successfully and the output
is varified.

Experiment no: 7

AIM: Program to sort string.

CO :

PROGRAM:
```
import java.util.Scanner;
import java.util.Arrays;
public class sort
{
    public static void main (String[] args)
    {
        int i,j;
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter the no: of words");
        int num= sc.nextInt();
        String word[] = new String(num];
        sc.nextLine();
        for (i=0; i<num; i++)
        {
            System.out.println("\n Enter a word \n");
            word[i]= sc.nextLine();
        3.
        for (i=0; i< num-1; i++)
        {
            for (j=i+1; j <num; j++)
            {
                if (word[i].compareTo (word[j])>0)
                {
                    String temp = word[i];
```

```
            word[i] = word[j];
            word[j] = temp;
        }
    }
    System.out.println("");
}
System.out.println("sorted strings");
for(i=0; i<num; i++)
{
    System.out.println(word[i]);
}
}
}
```

Output:
Enter nos of words : 3
Enter a word : here
Enter a word : how
Enter a word : hai
sorted strings
hai
here
how

Result:
The program executed successfully and the output
is verified.

Experiment no : 8

aim: Program to find area of circle, rectangle and cube.

CO :

PROGRAM:
```
import java.util.*;
public class Shapes
{
    void area (int r1)
    {
        double Area_val = 3.14 * r1 * r1;
        System.out.println ("\n Area of circle: "+ Area_val);
    }
    void area (int a1, int b1)
    {
        double Area_val = a1 * b1;
        System.out.println ("\n Area of rectangle:"+area_val);
    }
    void area (int a1, intb1, int c1)
    {
        double Area_val = a1 * b1 * c1;
        System.out.println ("\n Area of cube: "+Area_val);
    }
    public static void main (String args[])
    {
        Scanner sc = new Scanner (System.io);
        System.out.println ("\n Enter the length:");
        int l = sc.nextInt();
```

```java
System.out.println ("\n Enter the breadth:");
int b = sc.nextInt();
System.out.println ("\n Enter the height:");
int b = sc.nextInt();
System.out.println ("\n Enter the radius:");
int r = sc.nextInt();
Shapes obj1 = new Shapes();
obj1.area(r);
obj1.area(l,b);
obj1.area(l,b,b);
        3.
3.
```

Output:
Enter the length : 4
Enter the breadth : 2
Enter the height : 3
Enter the radius : 5

Area of circle : 78.5
Area of rectangle : 8.0
Area of cube : 24.0

Result:
The program executed successfully and the output is
varified.

Experiment no: 9

AIM: Write a program has class publisher, book,
literature and fiction. Read the information and
print the details of book from either the
category, using inheritance.

CO :

PROGRAM:
```
import java.util.Scanner;
class Publisher
{
    String publisher;
    Publisher (String pub)
    {
        this.publisher = pub;
    }
}
class Book extends Publisher.
{
    String book;
    Book (String pub, String boo)
    {
        super (pub);
        book = boo;
    }
}
class Literature extends Book
{
    String category;
```

```java
Literature (String pub, String boo)
{
    super (pub, boo);
}
void display ()
{
    System.out.println ("Publisher: " + publisher);
    System.out.println ("Book: " + book);
}
}
class Fiction extends Book
{
    Fiction (String pub, String boo)
    {
        super (pub, boo);
    }
    void display ()
    {
        System.out.println ("Publisher: " + publisher);
        System.out.println ("Book: " + book);
    }
}
public class BookDetails
{
    public static void main (String[] args)
    {
        System.out.println ("Enter the no of Literature Books:");
        Scanner scl = new Scanner (System.in);
        int num = scl.nextInt ();
        Literature arr[] = new Literature [num];
        System.out.println ("Enter the Literature book details");
        int x=0, j=0;
```

```java
Scanner sc = new Scanner(System.in);
for(int i=0; i<num; i++)
{
        x = i+1;
        System.out.println("\n" +x+ ").");
        System.out.println("\n Book:");
        String boo = sc.next();
        System.out.println("\n Publisher:");
        String pub = sc.next();
        arr[i] = new Literature(boo, pub);
}

System.out.println("Enter no. of fiction book");
int num1 = sc1.nextInt();
Fiction arr1[] = new Fiction[num1];
System.out.println("Enter the fiction book details");
int x1=0, j1=0;
for(int i=0; i<num1; i++)
{
        x1 = i+1;
        System.out.println(x1);
        System.out.println("Book:");
        String boo = sc.next();
        System.out.println("Publisher:");
        String pub = sc.next();
        arr1[i] = new Fiction(boo, pub);
}
sc.close();
sc1.close();
System.out.println("Information of all Literature Book");
for(int i=0; i<num; i++)
{
        j = i+1;
```

```java
System.out.println ("\n"+j+").");
arr[i].display();
}

System.out.println ("Information of all fiction books");
for (int i=0; i<num1; i++)
{

jl = i+1;
System.out.println ("\n"+jl+").");
arr[i].display();
}
}
}
```

Output:

Enter no: of literature books: 2.
Enter book details
1) Book : java
   Publisher : oxford.
2) Book: tomp
   Publisher : oxford.

Enter no: of fiction books: 2.
Enter book details.
1) Book: creep
   Publisher : dcbooks
2) Book: streak
   Publisher : dcbooks.

Information of all literature books
1) Book: java
   Publisher: oxford

2) Book : tomp.
   Publisher: oxford.

Information of all fiction books.
1) Book : creep.
   Publisher: dcbooks
2) Book : Streak
   Publisher : dcbooks.

Result:
Program executed successfully and the output is
verified.

Experiment no : 10.

AIM: Create a class students and sports. Create another class result inherited from students and sports. Display the academic sports score of a student.

CO :

PROGRAM:
```
import java.util.Scanner;
class Sports
{
    String sport;
    int Rating;
    Sports (String spo, int ra)
    {
        sport = spo;
        Rating = ra;
    }
}
class Student extends Sports
{
    String Grade;
    double Overall_per;
    Student (String spo, int ra, String gd, double per)
    {
        super(spo, ra);
        Grade = gd;
        Overall_per = per;
    }
}
```

```java
Public class Result extends Student
{
    Result (String spo, int ra, String gd, double per)
    {
        super (spo, ra, gd, per);
    }
    void display()
    {
        System.out.println("\n Sports details of students");
        System.out.println("Sports : "+ sport);
        System.out.println("Rating : "+ Rating);
        System.out.println("\n academic details of students");
        System.out.println("Academic grade:"+ Grade);
        System.out.println("Overall percentage :"+ Overall-per);
    }
    public static void main(String[] args)
    {
        Scanner sc = new Scanner (System.in);
        System.out.println("\n Enter sports details of stude
        System.out.println("\n sport :");
        String a = sc.next();
        System.out.println("\n Rating:");
        int b= sc.nextInt();
        System.out.println("\n Enter academic details of studa
        System.out.println("\n Academic grade:");
        String c= sc.next();
        System.out.println("\n Overall percentage :");
        double d= sc.nextDouble();
        sc.close();
        Result obj = new Result (a,b,c,d);
        obj.display();
    }
}
```

Output:
Enter sports details of students
Sport : shortput
Rating : 50
Enter academic details of students
Academic grade: A
Overall percentage: 85

Sports details of students
Sports : shotput
Rating : 50

Academic details of students
Academic grade : A
Oveall percentage : 85.0.

Result:
The program excecuted successfully and the output
is varified.

Experiment no: 11

AIM:

CO :

PROGRAM:

```
import java.util.Scanner;
interface calc
{
    void calculate();
}
class bill implements calc
{
    String date, name, p_id;
    int quantity;
    double unit_price, total, namount=0;
    Scanner sc=new Scanner(System.In);
    public void getdata()
    {
        System.out.println("Product id:");
        p_id = sc.nextLine();
        System.out.println("Product name:");
        name = sc.nextLine();
        System.out.println("Quantity:");
        quantity = sc.nextInt();
        System.out.println("Unit price:");
        unit_price = sc.nextDouble();
    }
```

```java
    public void calculate()
    {
        total = quantity * unit_price;
    }
    public void display()
    {
        System.out.println(p_id+"   "+name+"   "+quantity+
                        "    "+unit_price+"   "+total);
    }
}
public class CBill
{
    public static void main(String[] args)
    {
        int n, i;
        double namount = 0, t;
        int ran;
        String date;
        t = Math.random() * 1000000;
        ran = (int)t;
        Scanner sc = new Scanner(System.in);
        System.out.println("Order no# "+ran);
        System.out.println("Enter the date:");
        date = sc.nextLine();
        System.out.println("How many products:");
        n = sc.nextInt();
        bill ob[] = new bill[n];
        for (i=0; i<n; i++)
        ob[i] = new bill();
        for (i=0; i<n; i++)
        {
            ob[i].getdata();
```

```
                    ob[i].calculate();
        }
        System.out.println ("Date: "+date);
        System.out.println ("Product Id "+ "  "+"Name"+ "  "+
                            "Quantity"+ "  "+ "Unit price"+ "  "+ "Tota
        System.out.println ("................................................."
        for (i=0; i<n;i++)
        {
            ob[i].display();
            namount += ob[i].total;
        }
        System.out.println("...............................................");
        System.out.println ("\t Net Amount \t "+ namount);
    }
}
```

Output:
Order no. #456954
Enter the date:
2/4/19
How many products:
3
Product id:
101
Product name:
chair
Quantity:
2
Unit price:
100

Product id:
102
Product name:
table.
Quantity:
1
unit price
500
Product id:
103
Product name:
teapoy
Quantity:
1
unit price
200.

Date: 2/4/19

Product Id	Name	Quantity	Unit price	Total.
101	chair	2	100.0	200.0
102	table	1	500.0	500.0
103	teapoy	1	200.0	200.0
		Net Amount		900.0

Result:
The program executed successfuly and the output is
varified.

Experiment no: 12

AIM: Create an interface having prototype of function area() and perimeter(). Create 2 classes circle and rectangle which implements the above interface. Create a menu driven program to find area and perimeter of objects.

CO :

PROGRAM:

```java
import java.util.Scanner;
interface Properties
{
    void getdata();
    void area();
    void perimeter();
}
class Circle implements Properties
{
    double pi= 3.14;
    double r;
    Scanner sc=new Scanner (System.in);
    public void getdata()
    {
        System.out.println ("Enter the radius of circle");
        r =sc.nextDouble();
    }
    public void perimeter()
    {
        System.out.println ("Perimeter of circle:"+(pi*r*2));
    }
```

```java
    public void area()
    {
        System.out.println("Area of circle : "+(pi*r*r));
    }
}
class Rectangle implements Properties
{
    double l,b;
    Scanner sc = new Scanner(System.in);
    public void getdata()
    {
        System.out.println("Length of rectangle: ");
        l = sc.nextDouble();
        System.out.println("Breadth of rectangle: ");
        b = sc.nextDouble();
    }
    public void area()
    {
        System.out.println("Area of rectangle : "+(l*b));
    }
    public void perimeter()
    {
        System.out.println("Perimeter of rectangle : "+(2*(l+b)));
    }
}
public class CircRectInterface
{
    public static void main(String[] args)
    {
        int cb;
        Scanner sc=new Scanner(System.in);
        Circle ob = new Circle();
```

```java
Rectangle obj = new Rectangle();
do
{
    System.out.println("\n1. Circle \n 2. Rectangle \n 3. Exit");
    System.out.print("Enter your choices");
    ch = sc.nextInt();
    switch (ch)
    {
        case 1: ob.getdata();
        ob.area();
        ob.paimeta();
        break;
        case 2: obj.getdata();
        obj.area();
        obj.perimeter();
        break;
        case 3: System.out.println("Exit...");
        System.exit(0);
    }
} while (true);
}
}
```

Output :

1. Circle
2. Rectangle
3 Exit

Enter your choice:

1

Enter the radius of circle:
3
Area of circle: 28.2599
Perimeter of circle: 18.84

1. Circle
2. Rectangle
3. Exit.
Enter your choice:
2
Length of rectangle:
2
Breadth of rectangle:
4
Area of rectangle: 8.0
Perimeter of rectangle: 12.0

Result:
The program executed successfully and the output is varified.