

Program : 01

Aim : Define a class 'Product' with data members pcode , pname , price . Create 3 objects of the class and find the product having the lowest price.

Source Code:

```
import java.util.*;

import java.util.Scanner;

public class Product{

    int pcode;

    String pname;

    double price;

    void input()
    {
        Scanner inp=new Scanner(System.in);

        System.out.println("Product Code : ");

        pcode=inp.nextInt();

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

        pname=inp.next();

        System.out.println("Product Price : ");

        price=inp.nextInt();

    }
    void display()
    {

        System.out.println(pcode+"\t"+pname+"\t"+price) ;

    }
    static void lowest(double price1,double price2,double price3)

    {

        if(price1<price2 && price1<price3)

        {

            System.out.print("Product 1 is lowest price.");
```

```

    }

    else if(price2<price1 && price2<price3)
    {

        System.out.println("Product 2 is lowest price.");

    }
    else
    {
        System.out.println("Product 3 is lowest price.");

    }
}
public static void main(String[]args){

    Product obj1=new Product();

    Product obj2=new Product();

    Product obj3=new Product();

    System.out.println("Enter the details of 1st product:");

    obj1.input();

    System.out.println("Enter the details of 2nd product:");

    obj2.input();

    System.out.println("Enter the details of 3rd product:");

    obj3.input();

    System.out.println("Product Information:\n
    Product_Code\tProduct_Name\tProduct_Price");

    obj1.display();

    obj2.display();

    obj3.display();

    lowest(obj1.price,obj2.price,obj3.price);

}
}

```

Output

```
ubuntu@CCF:~$ javac Product.java
ubuntu@CCF:~$ java Product
Enter the details of 1st product:
Product Code :
100
Product Name :
Soap
Product Price :
70
Enter the details of 2nd product:
Product Code :
101
Product Name :
Book
Product Price :
140
Enter the details of 3rd product:
Product Code :
102
Product Name :
Pen
Product Price :
60
Product Information:
  Product_Code  Product_Name  Product_Price
100      Soap      70.0
101      Book      140.0
102      Pen       60.0
Product 3 is lowest price.
ubuntu@CCF:~$
```

RESULT

Program executed successfully.

Program : 02

Aim: Read two matrix from the console and perform matrix addition.

Source Code:

```
import java.util.Scanner;

class Matrix{

    public static void main(String args[]){

        int r,c,i,j;

        Scanner inp = new Scanner(System.in);

        System.out.println("Enter the number of rows");

        r=inp.nextInt();

        System.out.println("Enter the number columns");

        c=inp.nextInt();

        int a[][] = new int[r][c];

        int b[][] = new int[r][c];

        int sum[][] = new int[r][c];

        System.out.println("Enter the elements of matrix 1");

        for(i=0;i<r;i++){

            for(j=0;j<c;j++ )

                a[i][j]=inp.nextInt();

            System.out.println();

        }

        System.out.println("Enter the elements of matrix 2");

        for(i=0;i<r;i++){

            for(j=0;j<c;j++)

                b[i][j] = inp.nextInt();

            System.out.println();

        }

    }

}
```

```

    }

    for(i=0;i<r;i++ )

        for(j=0;j<c;j++ )

            sum[i][j] = a[i][j]+b[i][j] ;

    System.out.println("Sum of matrices:-");

    for(i=0;i<r;i++ ){

        for(j=0;j<c;j++ )

            System.out.print(sum[i][j]+"\\t");

        System.out.println();

    }

}

}

}

```

Output

```

ubuntu@ubuntu-desktop:~/soorya$ javac Matrix.java
ubuntu@ubuntu-desktop:~/soorya$ java Matrix
Enter the number of rows
2
Enter the number columns
2
Enter the elements of matrix 1
2 4 6 8

Enter the elements of matrix 2
1 3 5 7

Sum of matrices:-
3      7
11     15

```

RESULT

Program executed successfully.

Program : 03

Aim: Add two complex numbers.

Source Code:

```
public class complexnum{

    double real;

    double img;

    complexnum(double r,double i){

        this.real=r;

        this.img=i;

    }

    complexnum(){ };

    complexnum sum(complexnum c1,complexnum c2)

    {

        complexnum temp=new complexnum();

        temp.real=c1.real+c2.real;

        temp.img=c1.img+c2.img;

        return temp;

    }

    public static void main(String[] args){

        complexnum c1=new complexnum(2,3);

        complexnum c2=new complexnum(3,6);

        complexnum temp1=new complexnum();

        temp1=temp1.sum(c1,c2);

        System.out.println("Sum of complex numbers is:"+temp1.real+"i"+temp1.img);

    }

}
```

Output

```
ubuntu@CCF:~$ ls
array.class      complexnum.class  Documents  Pictures  Soorya     Videos
array.java       complexnum.java   Downloads  Public    sort.class
binarysearch.c   Desktop          Music      snap      Templates
ubuntu@CCF:~$ javac complexnum.java
ubuntu@CCF:~$ java complexnum
Sum of complex numbers is:5.0+i9.0
ubuntu@CCF:~$
```

RESULT

Program executed successfully.

Program : 04

Aim: Create CPU with attribute price. Create inner class Processor (no. of cores, manufacturer) and static nested class RAM (memory, manufacturer). Create an object of CPU and print information of Processor and RAM.

Source Code:

```
class CPU{

    double price;

    class Processor{

        double cores;

        String manufacturer;

        double getCache(){

            return 4.3;

        }

    }

    static class RAM{

        double memory;

        String manufacturer;

        double getClockSpeed(){

            return 5.5;

        }

    }

}

public class Main{

    public static void main(String[] args){

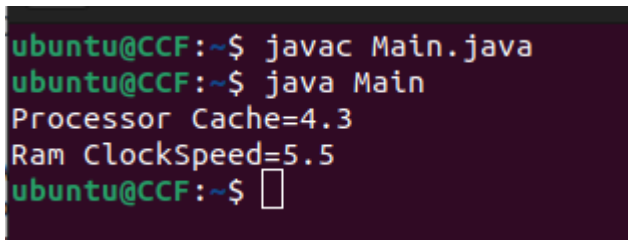
        CPU cpu=new CPU();

        CPU.Processor processor=cpu.new Processor();
```



```
CPU.RAM ram=new CPU.RAM();  
  
System.out.println("Processor Cache="+processor.getCache());  
  
System.out.println("Ram ClockSpeed="+ram.getClockSpeed());  
  
}  
  
}
```

Output



```
ubuntu@CCF:~$ javac Main.java  
ubuntu@CCF:~$ java Main  
Processor Cache=4.3  
Ram ClockSpeed=5.5  
ubuntu@CCF:~$
```

RESULT

Program executed successfully.

Program : 05

Aim : Program to Sort strings.

Source Code:

```
import java.util.Arrays;

import java.util.Scanner;

public class StrSort{

    public static void main(String[] args){

        int n1;

        Scanner read=new Scanner(System.in);

        System.out.println("Enter the size of the array:");

        n1=read.nextInt();

        System.out.println("Enter the values:");

        String[] arr=new String[n1];

        for(int i=0;i<n1;i++)

        {

            arr[i]=read.next();

        }

        Arrays.sort(arr);

        System.out.println("String of array after sorting:");

        for(int i=0;i<n1;i++)

        {

            System.out.println(arr[i]+" ");

        }

    }

}
```

Output

```
ubuntu@CCF:~$ javac StrSort.java
ubuntu@CCF:~$ java StrSort
Enter the size of the array:
4
Enter the values:
Soorya
Ramesh
Asin
Oreo
String of array after sorting:
Asin,
Oreo,
Ramesh,
Soorya,
ubuntu@CCF:~$
```

RESULT

Program executed successfully.

Program : 06

Aim : Perform string manipulations.

Source Code:

```
import java.util.*;

class StringManipulation {

    Scanner reader = new Scanner(System.in);

    public void getLength() {

        System.out.print("Enter the string:");

        String s1 = reader.next();

        int len = s1.length();

        System.out.print("Length=" + len);

    }

    public void joinstr() {

        System.out.print("Enter the first string:");

        String s1 = reader.next();

        System.out.print("Enter second string");

        String s2 = reader.next();

        String joinedString = s1.concat(s2);

        System.out.print("Joined string is:" + joinedString);

    }

    public void charextract() {

        System.out.print("Enter the string:");

        String s1 = reader.next();

        System.out.print("Enter the position of the character to be extracted in the string:");

        int a = reader.nextInt();

        char c = s1.charAt(a);
```

```

        System.out.print("The character is:" + c);
    }

    public void strcmp() {
        System.out.print("Enter the first string:");

        String s1 = reader.next();

        System.out.print("Enter second string");

        String s2 = reader.next();

        System.out.print("Enter the third string:");

        String s3 = reader.next();

        boolean result1 = s1.equals(s2);

        System.out.print("Strings first and second are equal:" + result1);

        boolean result2 = s1.equals(s3);

        System.out.print("Strings first and third are equal:" + result2);
    }

    public void subsearch() {
        System.out.print("Enter the string:");

        String s4 = reader.next();

        System.out.print("Enter the character to be searched in the string:");

        String a = reader.next();

        System.out.print("Last occurrence of character 'a' is found at:" + s4.lastIndexOf("a"));

        int first_in = s4.indexOf("a", 2);

        System.out.print("First occurrence of char 'a' after index 2:" + first_in);
    }
}

class str {

```

```

public static void main(String[] args) {

    StringManipulation obj = new StringManipulation();

    Scanner reader = new Scanner(System.in);

    do{

        System.out.println("\n\n\n__MENU__\n1.Length of a String\n2.Join two
Strings.\n3.Character extraction.\n4.String Comparison.\n5.Searching Substring.\n6.Exit.
\n");

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

        int ch = reader.nextInt();

        switch (ch) {

            case 1:

                obj.getLength();

                break;

            case 2:

                obj.joinstr();

                break;

            case 3:

                obj.charextract();

                break;

            case 4:

                obj.strcmp();

                break;

            case 5:

                obj.subsearch();

                break;

            case 6:

```

```
        System.exit(0);

        break;

    default:

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

        break;

    }

}while(true);

}
```

Output

```
ubuntu@ubuntu-desktop:~/soorya$ javac str.java
ubuntu@ubuntu-desktop:~/soorya$ java str

__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
1
Enter the string:Program
Length=7

__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
2
Enter the first string:Java
Enter second string:program
Joined string is:Javaprogram

__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
3
Enter the string:Program
Enter the position of the character to be extracted in the string:4
The character is:g
```



```
__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
4
Enter the first string:Java
Enter second string:Program
Enter the third string:Java
Strings first and second are equal:false
Strings first and third are equal:true

__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
5
Enter the string:animal
Enter the character to be searched in the string:a
Last occurrence of character a is found at:5
First occurrence of character a after index 2: 4

__MENU__
1.Length of a String
2.Join two Strings.
3.Character extraction.
4.String Comparison.
5.Searching Substring.
6.Exit.

Enter your choice:
6
ubuntu@ubuntu-desktop:~/soorya$
```

RESULT

Program executed successfully.

Program : 07

Aim: Program to create a class for Employee having attributes eNo, eName eSalary. Read n employ information and Search for an employee given eNo, using the concept of Array of objects.

Source Code:

```
import java.util.Scanner;

public class Employee{

    int eNo;

    String eName;

    double eSalary;

    void getdata(){

        System.out.println("Enter Employee details:");

        Scanner inp=new Scanner(System.in);

        System.out.println("Employee No:");

        eNo=inp.nextInt();

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

        eName=inp.next();

        System.out.println("Employee salary:");

        eSalary=inp.nextDouble();

    }

    void display(){

        System.out.println("Employee No:"+eNo);

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

        System.out.println("Salary Amount:"+eSalary+"\n");

    }

    public static void main(String[] args){
```

```

System.out.println("\n Enter the No of Employee's : ");

Scanner input=new Scanner(System.in);

int n=input.nextInt();

Employee arr[]=new Employee[n];

for(int i=0;i<n;i++){

    arr[i]=new Employee();

    arr[i].getdata();

}

System.out.println("\n Emplyee Details : ");

for(int i=0;i<n;i++){

    arr[i].display();

}

System.out.println("\n Enter the Employee Number to be Searched : \n");

int n1=input.nextInt();

for(int i=0;i<n;i++){

    if(arr[i].eNo==n1){

        arr[i].display();

    }

}

}

}

```

Output

```
ubuntu@ubuntu-desktop:~/soorya$ javac Employee.java
ubuntu@ubuntu-desktop:~/soorya$ java Employee

Enter the No of Employee's :
3
Enter Employee details:
Employee No:
101
Employee Name:
Soorya
Employee salary:
60000
Enter Employee details:
Employee No:
111
Employee Name:
Zain
Employee salary:
35000
Enter Employee details:
Employee No:
100
Employee Name:
Rhoyif
Employee salary:
50000

Employee Details :
Employee No:101
Name:Soorya
Salary Amount:60000.0

Employee No:111
Name:Zain
Salary Amount:35000.0
```

```
Employee No:100
Name:Rhoyif
Salary Amount:50000.0

Enter the Employee Number to be Searched :

101
Employee No:101
Name:Soorya
Salary Amount:60000.0
```

RESULT

Program executed successfully.

Program : 08

Aim : Area of different shapes using overloaded functions.

Source Code:

```
import java.util.Scanner;

class A{

    int a,b;

    int area(int side){

        this.a=side;

        return(a*a);

    }

    int area(int a,int b){

        this.a=a;

        this.b=b;

        return(a*b);

    }

}

class Overload{

    public static void main(String []args){

        int a,b,side;

        Scanner inp=new Scanner(System.in);

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

        a=inp.nextInt();

        b=inp.nextInt();

        System.out.println("Enter the side of the square:");

        side=inp.nextInt();

        A obj=new A();
```

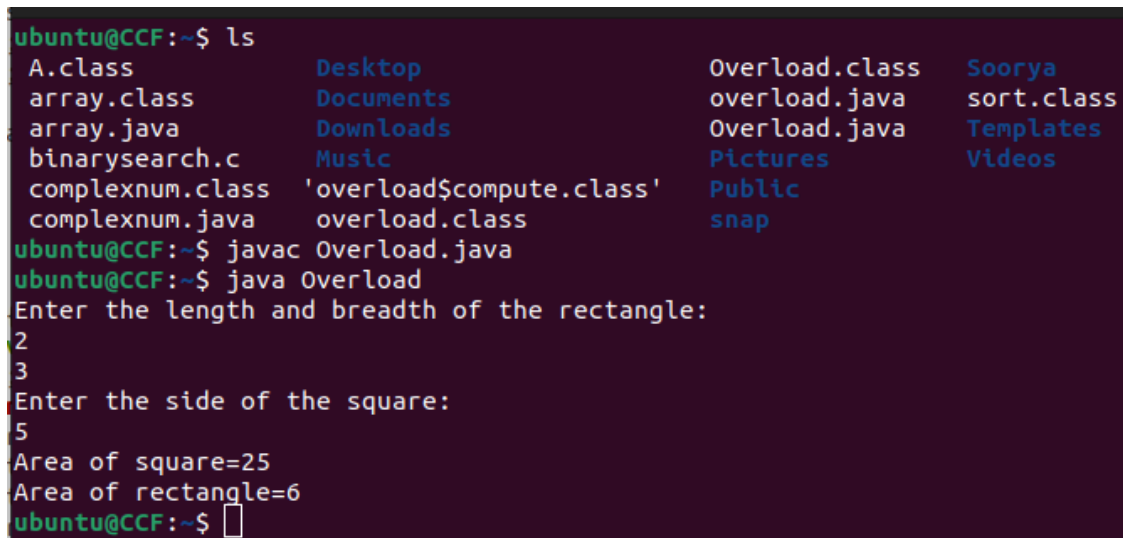
```
System.out.println("Area of square="+obj.area(side));

System.out.println("Area of rectangle="+obj.area(a,b));

}

}
```

Output



```
ubuntu@CCF:~$ ls
A.class          Desktop          Overload.class   Soorya
array.class      Documents        overload.java     sort.class
array.java       Downloads        Overload.java     Templates
binarysearch.c   Music            Pictures          Videos
complexnum.class 'overload$compute.class' Public
complexnum.java  overload.class   snap

ubuntu@CCF:~$ javac Overload.java
ubuntu@CCF:~$ java Overload
Enter the length and breadth of the rectangle:
2
3
Enter the side of the square:
5
Area of square=25
Area of rectangle=6
ubuntu@CCF:~$
```

RESULT

Program executed successfully.

Program : 09

Aim : Create a class 'Person' with data members Name, Gender, Address, Age and a constructor to initialize the data members and another class 'Employee' 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 Employee and contains its own data members like Subject, Department, Teacherid and contain constructors and methods to display the data members. Use array of objects to display details of N teachers.

Source Code:

```
import java.util.*;

class Person{

    String name,gender,address;

    int age;

    Person(String name,String gender,String address,int age){

        this.name = name;

        this.gender = gender;

        this.address = address;

        this.age = age;

    }

    void display(){

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

        System.out.println("Name: " + name + ", Gender: " + gender + ", Address: " + address + "
and Age " + age);

    }

}

class Employee extends Person{

    String Company_name, Qualification, Salary;

    int Empid;
```

```

Employee(String name,String gender,String address,int age,String Company_name,String
Qualification,String Salary,int Empid){

    super(name,gender,address,age);

    this.Company_name = Company_name;

    this.Qualification = Qualification;

    this.Salary = Salary;

    this.Empid = Empid;
}

void display(){

    super.display();

    System.out.println(" ");

    System.out.println("Company_name: " + Company_name + ", Qualification: " +
Qualification + ", Salary: " + Salary + " and Empid " + Empid);

}

}

class Teacher extends Employee{

    String Subject, Department;

    int Teacherid;

    Teacher(String name,String gender,String address,int age,String Company_name,String
Qualification,String Salary,int Empid,String Subject,String Department,int Teacherid){

        super(name,gender,address,age,Company_name,Qualification,Salary,Empid);

        this.Subject = Subject;

        this.Department = Department;

        this.Teacherid = Teacherid;

    }

    void display() {

        super.display()

```



```

System.out.println(" ");

System.out.println("Subject: " + Subject + ", Department: " + Department + " and
Teacherid: " + Teacherid);

}

}

class Inheritance{

    public static void main(String[] args) {

        Scanner inp=new Scanner(System.in);

        System.out.println("Enter Number of teachers: ");

        int n=inp.nextInt();

        Teacher obj[]=new Teacher[n];

        for(int i=0;i<n;i++)

        {
            System.out.print("Enter Person Name: ");

            String name=inp.next();

            System.out.print("Enter Person Age: ");

            int age=inp.nextInt();

            System.out.print("Enter Person Gender: ");

            String Gender=inp.next();

            System.out.print("Enter Person Address: ");

            String Address=inp.next();

            System.out.print("Enter Employee Company_name: ");

            String Company_name=inp.next();

            System.out.print("Enter Employee Empid: ");

            int Empid=inp.nextInt();

            System.out.print("Enter Employee Qualification: ");

```

```

        String Qualification=inp.next();

        System.out.print("Enter Employee Salary : ");

        String Salary=inp.next();

        System.out.print("Enter TeacherID: ");

        int tid=inp.nextInt();

        System.out.print("Enter Teacher Subject: ");

        String Subject=inp.next();

        System.out.print("Enter Teacher Department : ");

        String Department=inp.next();

        obj[i] = new Teacher(name,Gender,Address
age,Company_name,Qualification,Salary,Empid,Subject,Department,tid);

        System.out.println(" ");

    }

    for(int i=0;i<n;i++)

    {

        obj[i].display();

    }

}

```

Output

```
ubuntu@ubuntu-desktop:~/soorya$ javac Inheritance.java
ubuntu@ubuntu-desktop:~/soorya$ java Inheritance
Enter Number of teachers:
2
Enter Person Name: Kavitha
Enter Person Age: 40
Enter Person Gender: F
Enter Person Address: PNRA
Enter Employee Company_name: Infosys
Enter Employee Empid: 10
Enter Employee Qualification: MCA
Enter Employee Salary : 50000
Enter TeacherID: 20
Enter Teacher Subject: AI
Enter Teacher Department : CS

Enter Person Name: Mahesh
Enter Person Age: 38
Enter Person Gender: M
Enter Person Address: KMRA
Enter Employee Company_name: UST
Enter Employee Empid: 15
Enter Employee Qualification: PhD
Enter Employee Salary : 85000
Enter TeacherID: 30
Enter Teacher Subject: CyberSecurity
Enter Teacher Department : CS
```

```
Name: Kavitha, Gender: F, Address: PNRA and Age 40

Company_name: Infosys, Qualification: MCA, Salary: 50000 and Empid 10

Subject: AI, Department: CS and Teacherid: 20


Name: Mahesh, Gender: M, Address: KMRA and Age 38

Company_name: UST, Qualification: PhD, Salary: 85000 and Empid 15

Subject: CyberSecurity, Department: CS and Teacherid: 30
```

RESULT

Program executed successfully.

Program : 10

Aim : Create an interface having prototypes of functions area() and perimeter(). Create two classes Circle and Rectangle which implements the above interface. Create a menu driven program to find area and perimeter of objects.

Source Code :

```
import java.util.*;

interface prototype{

    void circle();

    void rectangle();
}

class CircleCompute implements prototype{

    Scanner inp=new Scanner(System.in);

    public void circle(){

        double radius;

        System.out.print("Enter the radius:");

        radius=inp.nextDouble();

        double cir_area=3.14*radius*radius;

        double cir_peri=2*3.14*radius;

        System.out.println("Area of circle="+cir_area);

        System.out.println("Perimeter of circle="+cir_peri);

    }

    public void rectangle(){ }

}

class RectCompute implements prototype{

    Scanner inp=new Scanner(System.in);

    public void rectangle(){

        double length,breadth;
```

```

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

        length=inp.nextDouble();

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

        breadth=inp.nextDouble();

        double rect_area=length*breadth;

        double rect_peri=2*(length+breadth);

        System.out.println("Area of rectangle="+rect_area);

        System.out.println("Perimeter of rectangle="+rect_peri);

    }
    public void circle(){ }

}

public class Interface{

    public static void main(String[] args){

        CircleCompute obj=new CircleCompute();

        RectCompute obj2=new RectCompute();

        double length,breadth;

        Scanner inp=new Scanner(System.in);
    do

    {

        System.out.println("\n\n\n__MENU__\n1.Area and Perimeter of Circle.\n2.Area and
perimeter of rectangle.\n3.Exit");

        System.out.print("Enter your choice:");

        int ch = inp.nextInt();

        switch (ch) {

            case 1:obj.circle();

                break;

```

```
        case 2:obj2.rectangle();  
            break;  
        case 3:System.exit(0);  
            break;  
    }  
}while(true);  
}  
}
```

Output

```
ubuntu@ubuntu-desktop:~/soorya$ javac Interface.java
ubuntu@ubuntu-desktop:~/soorya$ java Interface

__MENU__
1.Area and Perimeter of Circle.
2.Area and perimeter of rectangle.
3.Exit
Enter your choice:1
Enter the radius:2
Area of circle=12.56
Perimeter of circle=12.56

__MENU__
1.Area and Perimeter of Circle.
2.Area and perimeter of rectangle.
3.Exit
Enter your choice:2
Enter the length of the rectangle:2
Enter the breadth of the rectangle:3
Area of rectangle=6.0
Perimeter of rectangle=10.0

__MENU__
1.Area and Perimeter of Circle.
2.Area and perimeter of rectangle.
3.Exit
Enter your choice:3
ubuntu@ubuntu-desktop:~/soorya$
```

RESULT

Program executed successfully.

Program : 11

Aim : Create a Graphics package that has classes and interfaces for figures Rectangle, Triangle, Square and Circle. Test the package by finding the area of these figures.

Source Code:

Triangle1.java:-

```
package graphics;

public class Triangle1 {

    public void area(int b,int h){

        int a=(b*h)/2;

        System.out.println("Area of traingle: "+a);

    }

}
```

Square1.java:-

```
package graphics;

public class Square1 {

    public void area(int a){

        System.out.println("Area of Square: "+(a*a));

    }

}
```

Rectangle1.java:-

```
package graphics;

public class Rectangle1 {

    public void area(int l,int b){

        System.out.println("Area of Rectangle: "+(l*b));

    }

}
```


Circle1.java:-

```
package graphics;

public class Circle1{

    public void area(int r){

        System.out.println("Area of circle: "+(3.14*r*r));

    }

}
```

Package11.java:-

```
import java.util.Scanner;

import graphics.*;

public class Package11{

    public static void main(String[] args) {

        System.out.println("Program 11: Packages");

        System.out.println(" ");

        Scanner inp=new Scanner(System.in);

        boolean res=true;

        int ch;

        int rad,l,b,h;

        System.out.println(" M E N U ");

        System.out.println("1.Area of Circle");

        System.out.println("2.Area of Rectangle");

        System.out.println("3.Area of Square");

        System.out.println("4.Area of Triangle");

        System.out.println("5.Exit");

        while(res){
```

```
System.out.println(" ");

System.out.print("Enter your choice [1-5]: ");

System.out.println(" ");

ch=inp.nextInt();

switch(ch){

    case 1:

        System.out.print("Enter Radius of circle: ");

        rad=inp.nextInt();

        Circle1 c=new Circle1();

        c.area(rad);

        break;

    case 2:

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

        l=inp.nextInt();

        System.out.print("Enter width of rectangle: ");

        b=inp.nextInt();

        Rectangle1 r=new Rectangle1();

        r.area(l,b);

        break;

    case 3:

        System.out.print("Enter side of Square: ");

        l=inp.nextInt();

        Square1 s=new Square1();

        s.area(l);

        break;
```

case 4:

```
System.out.print("Enter base of triangle: ");
```

```
b = inp.nextInt();
```

```
System.out.print("Enter height of triangle: ");
```

```
h = inp.nextInt();
```

```
Triangle1 t=new Triangle1();
```

```
t.area(b,h);
```

```
break;
```

case 5:

```
res = false;
```

```
break;
```

default:

```
System.out.println(" Unexpected value");
```

```
}
```

```
}
```

```
}
```

```
}
```

Output

```
ubuntu@ubuntu-desktop:~/soorya$ javac Package11.java
ubuntu@ubuntu-desktop:~/soorya$ java Package11
Program 11: Packages

  M E N U
1.Area of Circle
2.Area of Rectangle
3.Area of Square
4.Area of Triangle
5.Exit

Enter your choice [1-5]:
1
Enter Radius of circle: 2
Area of circle: 12.56

Enter your choice [1-5]:
2
Enter length of rectangle: 3
Enter width of rectangle: 4
Area of Rectangle: 12

Enter your choice [1-5]:
3
Enter side of Square: 4
Area of Square: 16

Enter your choice [1-5]:
4
Enter base of triangle: 2
Enter height of triangle: 3
Area of traingle: 3

Enter your choice [1-5]:
5
ubuntu@ubuntu-desktop:~/soorya$
```

RESULT

Program executed successfully.

Program : 12

Aim : Write a user defined exception class to authenticate the user name and password.

Source Code:

```
import java.util.*;

import java.lang.Exception.*;

class UsernameException extends Exception{

    UsernameException(String msg){

        System.out.println(msg);

    }

}

class PasswordException extends Exception{

    PasswordException(String msg){

        System.out.println(msg);

    }

}

public class UserNamepass {

    public static void main(String[] args) {

        Scanner s=new Scanner(System.in);

        String username,password;

        System.out.println("Enter the username : ");

        username=s.nextLine();

        System.out.println("Enter the password : ");

        password=s.nextLine();

        try {

            if(username.length()<8)
```

```

        throw new UsernameException("Username length must be
greater than 8 characters.\n");

        else if(!password.equals("admin"))

            throw new PasswordException("Incorrect password.\n");

        else

            System.out.println("Login Successful.");

    }

    catch(UsernameException u) {

        System.out.println(u);

    }

    catch(PasswordException p) {

        System.out.println(p);

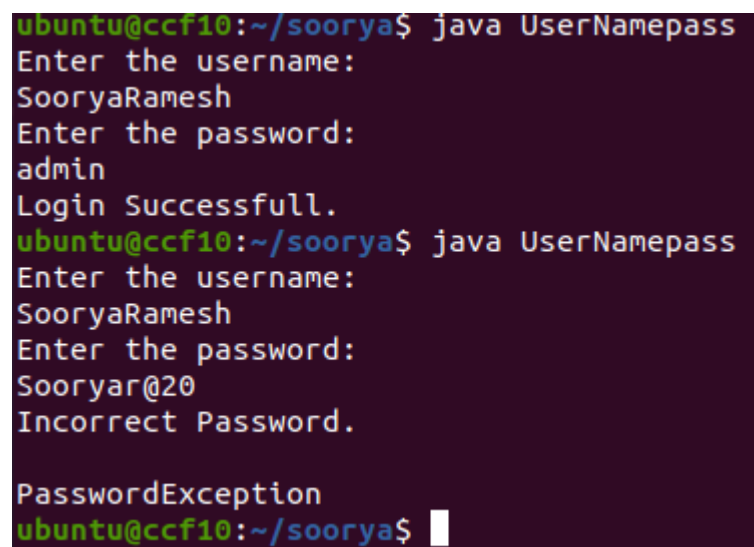
    }

}

}

```

Output



```

ubuntu@ccf10:~/soorya$ java UserNamepass
Enter the username:
SooryaRamesh
Enter the password:
admin
Login Successfull.
ubuntu@ccf10:~/soorya$ java UserNamepass
Enter the username:
SooryaRamesh
Enter the password:
Sooryar@20
Incorrect Password.

PasswordException
ubuntu@ccf10:~/soorya$ █

```

RESULT

Program executed successfully.

Program : 13

Aim : Find the average of N positive integers, raising a user defined exception for each negative input.

Source Code:

```
import java.util.*;

import java.lang.Exception;

class NegException extends Exception{

    NegException(String str){

        System.out.print(str);
    }
}

public class Avgposnum{

    public static void main(String args []){

        Scanner reader=new Scanner(System.in);

        double s=0;

        System.out.println("Enter the limit:");

        int n=reader.nextInt();

        System.out.println("Enter the numbers:");

        for(int a=0;a<n;a++){

            double i=reader.nextDouble();

            try{

                if(i<0){

                    a=a-1;

                    throw new NegException("Numbers can't be negative.");

                }

                else

                {

                    s=s+i;

                }

            }

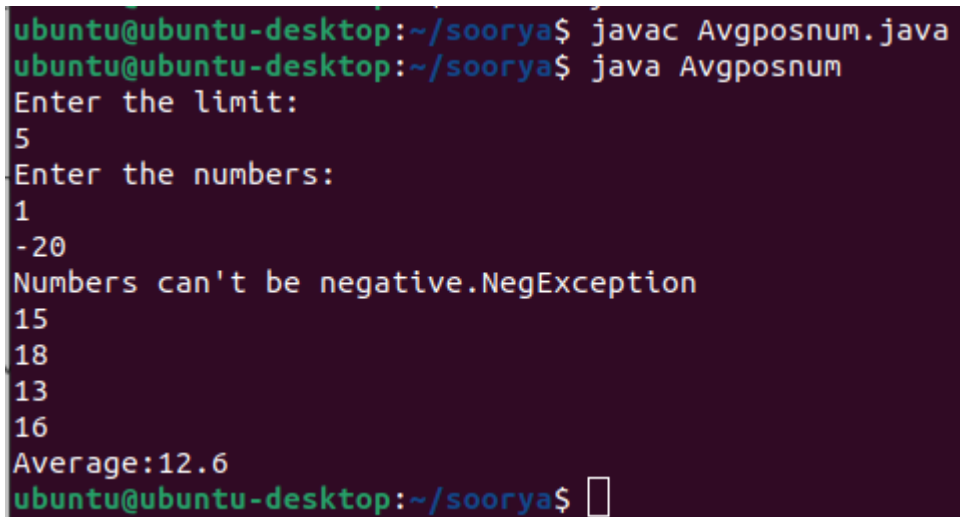
        }

    }

}
```

```
    }  
  
    catch(NegException u){  
  
        System.out.println(u);  
  
    }  
  
}  
  
double avg=s/n;  
  
System.out.println("Average:"+avg);  
  
}  
  
}
```

Output



```
ubuntu@ubuntu-desktop:~/soorya$ javac Avgposnum.java  
ubuntu@ubuntu-desktop:~/soorya$ java Avgposnum  
Enter the limit:  
5  
Enter the numbers:  
1  
-20  
Numbers can't be negative.NegException  
15  
18  
13  
16  
Average:12.6  
ubuntu@ubuntu-desktop:~/soorya$
```

RESULT

Program executed successfully.

Program : 14

Aim : Program to find maximum of three numbers using AWT.

Source Code:

```
import java.awt.*;

import java.net.*;

import java.awt.event.*;

public class maxawt extends Frame {

    TextField t1;

    TextField t2;

    TextField t3;

    TextField t4;

    Label l1,l2,l3,l4;

    Button b1,b2;

    maxawt(){

        setTitle("MAXIMUM");

        t1=new TextField();

        l1=new Label(" ENTER 1st NO ");

        l1.setBounds(100,45,145,20);

        t1.setBounds(100,75,145,20);

        t2=new TextField();

        l2=new Label(" ENTER 2nd NO ");

        l2.setBounds(100,110,145,20);

        t2.setBounds(100,145,145,20);

        t3=new TextField();

        l3=new Label(" ENTER 3rd NO ");
```

```

l3.setBounds(100,170,145,20);

t3.setBounds(100,200,145,20);


t4=new TextField();

l4=new Label(" ");

l4.setBounds(100,240,145,20);

t4.setBounds(100,240,135,20);


b1=new Button("FIND");

b1.setBounds(105,278,70,40);

b2=new Button("EXIT");

b2.setBounds(195,278,70,40);

add(b1);

add(b2);

add(l1);

add(t1);

add(l2);

add(t2);

add(l3);

add(t3);

add(l4);

add(t4);

setSize(400,400);

setVisible(true);

b1.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

```

```

        int a=Integer.parseInt(t1.getText());

        int b=Integer.parseInt(t2.getText());

        int c=Integer.parseInt(t3.getText());

        if(a>b && a>c) {

            l4.setText("MAXIMUM = "+String.valueOf(a));

        }

        else if(b>c) {

            l4.setText("MAXIMUM = "+String.valueOf(b));

        }

        else {

            l4.setText("MAXIMUM = "+String.valueOf(c));

        }

    }

});

b2.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        System.exit(0);

    }

});

}

public static void main(String args[]) {

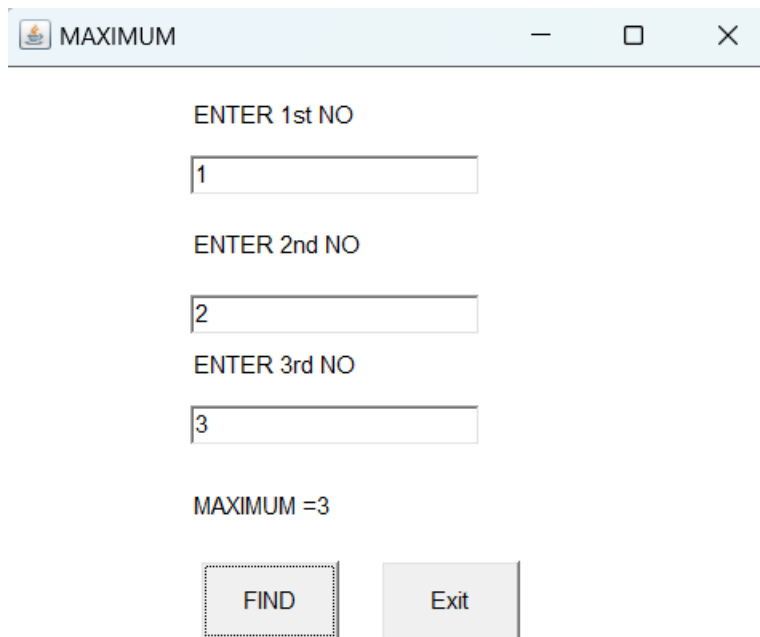
    new maxawt();

}

}

```

Output



The screenshot shows a Windows application window with the title bar 'MAXIMUM'. The window contains the following elements:

- Text label: 'ENTER 1st NO'
- Input field: A text box containing the number '1'.
- Text label: 'ENTER 2nd NO'
- Input field: A text box containing the number '2'.
- Text label: 'ENTER 3rd NO'
- Input field: A text box containing the number '3'.
- Text label: 'MAXIMUM =3'
- Buttons: Two buttons labeled 'FIND' and 'Exit'.

RESULT

Program executed successfully.

Program : 15

Aim : Implement a simple calculator using AWT components.

Source Code:

```
import java.awt.*;

import java.awt.event.*;

public class Calculator extends Frame {

    TextField t1,t2,t3;

    Label l1,l2,l3;

    Button b1,b2,b3,b4,b5,b6;

    Calculator(){

        setTitle("CALCULATOR");

        t1=new TextField();

        l1=new Label("Enter 1st No");

        l1.setBounds(100,45,145,20);

        t1.setBounds(100,75,145,20);

        t2=new TextField();

        l2=new Label("Enter 2nd No");

        l2.setBounds(100,110,145,20);

        t2.setBounds(100,145,145,20);

        t3=new TextField();

        l3=new Label("Result");

        l3.setBounds(100,169,145,20);

        t3.setBounds(100,185,145,20);

        b1=new Button("+");

        b1.setBounds(65,200,80,40);

        b2=new Button("-");
```

```
b2.setBounds(155,200,80,40);

b3=new Button("*");

b3.setBounds(245,200,80,40);

b4=new Button("/");

b4.setBounds(95,250,80,40);

b5=new Button("%");

b5.setBounds(195,250,80,40);

b6=new Button("EXIT");

b6.setBounds(140,310,70,40);

add(b1);

add(b2);

add(b3);

add(b4);

add(b5);

add(b6);

add(l1);

add(t1);

add(l2);

add(t2);

add(l3);

add(t3);

setSize(400,400);

setVisible(true);

b1.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {
```

```

        int a=Integer.parseInt(t1.getText());

        int b=Integer.parseInt(t2.getText());

        int c=a+b;

l3.setText(String.valueOf(a)+" "+String.valueOf(b)+"="+String.valueOf(c));

    }

});

b2.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        int a=Integer.parseInt(t1.getText());

        int b=Integer.parseInt(t2.getText());

        int c=a-b;

        l3.setText(String.valueOf(a)+"-
"+String.valueOf(b)+"="+String.valueOf(c));

    }

});

b3.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        int a=Integer.parseInt(t1.getText());

        int b=Integer.parseInt(t2.getText());

        int c=a*b;

l3.setText(String.valueOf(a)+"*"+String.valueOf(b)+"="+String.valueOf(c));

    }

});

b4.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        int a=Integer.parseInt(t1.getText());

```

```

        int b=Integer.parseInt(t2.getText());

        int c=a/b;

l3.setText(String.valueOf(a)+"/"+String.valueOf(b)+"="+String.valueOf(c));

    }

});
b5.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        int a=Integer.parseInt(t1.getText());

        int b=Integer.parseInt(t2.getText());

        int c=a%b;

l3.setText(String.valueOf(a)+"%"+String.valueOf(b)+"="+String.valueOf(c));

    }

});
b6.addActionListener(new ActionListener() {

    public void actionPerformed(ActionEvent e) {

        System.exit(0);

    }

});

}

public static void main(String[] args) {

    new Calculator();

}

}

```


Output

CALCULATOR — □ ×

Enter 1st No
20

Enter 2nd No
4

20+4=24

+ - *

/ %

EXIT

CALCULATOR — □ ×

Enter 1st No
20

Enter 2nd No
4

20-4=16

+ - *

/ %

EXIT

RESULT

Program executed successfully.

Program : 16

Aim : Define 2 classes; one for generating Fibonacci numbers and other for displaying even numbers in a given range. Implement using threads (Runnable Interface).

Source Code:

```
class FiboThread implements Runnable{

    public void run() {

        int a=0,b=1,c=0;

        System.out.println("Fibonacci Thread : "+a);

        System.out.println("Fibonacci Thread : "+a);

        for(int h=1;h<=7;h++) {

            c=a+b;

            System.out.println("Fibonacci Thread : "+c);

            a=b;

            b=c;

        }

    }

}

class EvenRangeThread implements Runnable{

    public void run() {

        int a=2,b=10;

        for(int k=a;k<=b;k+=2) {

            System.out.println("Even Thread : "+k);

        }

    }

}

public class FiboEven {

    public static void main(String[] args) {

        FiboThread ft=new FiboThread();

        EvenRangeThread et=new EvenRangeThread();

        Thread t1=new Thread(ft);
```

```

        Thread t2=new Thread(et);

        t1.start();

        t2.start();

    }

}

```

OUTPUT

```

PS C:\Users\LENOVO\Desktop\Java> javac FibEven.java
PS C:\Users\LENOVO\Desktop\Java> java FibEven
Fibonacci Thread : 0
Even Thread : 2
Even Thread : 4
Even Thread : 6
Even Thread : 8
Even Thread : 10
Fibonacci Thread : 1
Fibonacci Thread : 1
Fibonacci Thread : 2
Fibonacci Thread : 3
Fibonacci Thread : 5
Fibonacci Thread : 8
Fibonacci Thread : 13
Fibonacci Thread : 21
PS C:\Users\LENOVO\Desktop\Java> java FibEven
Fibonacci Thread : 0
Even Thread : 2
Fibonacci Thread : 1
Even Thread : 4
Even Thread : 6
Fibonacci Thread : 1
Even Thread : 8
Fibonacci Thread : 2
Fibonacci Thread : 3
Even Thread : 10
Fibonacci Thread : 5
Fibonacci Thread : 8
Fibonacci Thread : 13
Fibonacci Thread : 21
PS C:\Users\LENOVO\Desktop\Java> |

```

RESULT

Program executed successfully.

Program : 17

Aim : Write a program to write to a file, then read from the file and display the contents on the console.

Source Code:

```
import java.io.* ;

class Console

{

    public static void main(String[ ] args ) {

        try {

            FileWriter fw = new FileWriter(" abc.txt" ) ;

            fw.write(" Once upon a time.....");

            fw.close( ) ;

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

            char c ;

            FileReader fr=new FileReader(" abc.txt" ) ;

            BufferedReader in=new BufferedReader( fr ) ;

            String line=in.readLine( ) ;

            while ( line != null )

                {

                    System.out.println(line) ;

                    line=in.readLine( ) ;

                }

            in.close( ) ;

            fr.close( ) ;

        }

        catch ( IOException e ) {
```

```
System.out.println(" There a r e some IOException " );  
  
    }  
}  
}
```

OUTPUT

```
PS C:\Users\LENOVO\Desktop\Java> javac CreateFileAndWriteToConsole.java  
PS C:\Users\LENOVO\Desktop\Java> java CreateFileAndWriteToConsole  
  
File written  
Once upon a time.....  
PS C:\Users\LENOVO\Desktop\Java> |
```

RESULT

Program executed successfully.