

OBJECT ORIENTED PROGRAMMING LAB RECORD

Submitted by:

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RollNo:44

1. Add complex numbers

```
public class Complex{

    double real, img;

    Complex(double r, double i){

        this.real = r;

        this.img= i;

    }

    public static Complex sum(Complex c1, Complex c2)

    {

        Complex temp = new Complex(0, 0);

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

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

        return temp;

    }

    public static void main(String args[]) {

        Complex c1 = new Complex(2, 10);

        Complex c2 = new Complex(4.5, 3.5);

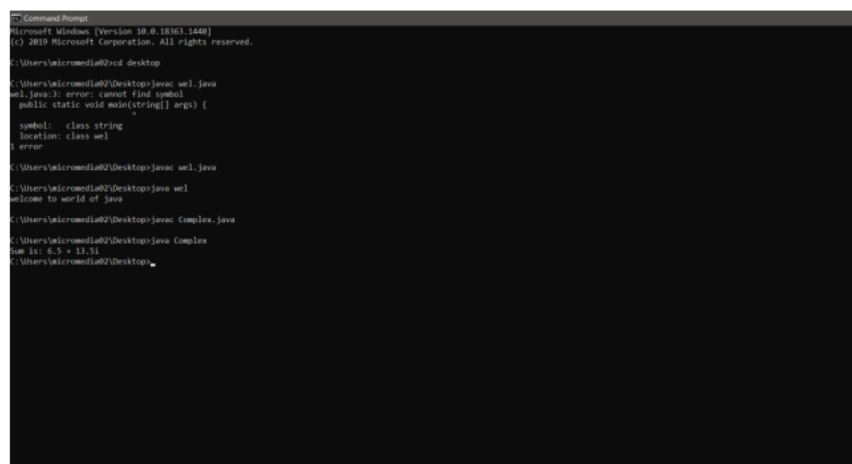
        Complex temp = sum(c1, c2);

        System.out.printf("Sum is: "+ temp.real+" + "+ temp.img + "i");

    }

}
```

Output



```
C:\Command Prompt
Microsoft Windows [Version 10.0.18362.1440]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\micromedia\Desktop>
C:\Users\micromedia\Desktop>javac wel.java
wel.java:3: error: cannot find symbol
    public static void main(String[] args) {
                        ^
  symbol:   class String
  location: class wel
1 error

C:\Users\micromedia\Desktop>javac Complex.java
C:\Users\micromedia\Desktop>java Complex
Sum is: 6.5 + 13.5i
C:\Users\micromedia\Desktop>
```

2.define a class product with data members pcode,pname,price.create 3 objects of the class and find the product having the lowest price

```
public class product {  
  
    int pcode;  
  
    String pname;  
  
    int price;  
  
  
    public static void main(String[] args) {  
  
        int smallest;  
  
        product p1 = new product();  
        product p2 = new product();  
        product p3 = new product();  
  
        p1.pcode=2000;  
        p1.pname="laptop";  
        p1.price=10000;  
        p2.pcode=1110;  
        p2.pname="hp";  
        p2.price=35000;  
        p3.pcode=2002;  
        p3.pname="intel i3";  
        p3.price=40000;  
  
        if(p1.price<p2.price) {  
            if(p3.price<p1.price) {  
                smallest = p3.price;  
            } else {  
                smallest = p1.price;  
            }  
        } else {  
            if(p2.price<p3.price) {  
                smallest = p2.price;  
            } else {
```

```

smallest = p3.price;

}

}

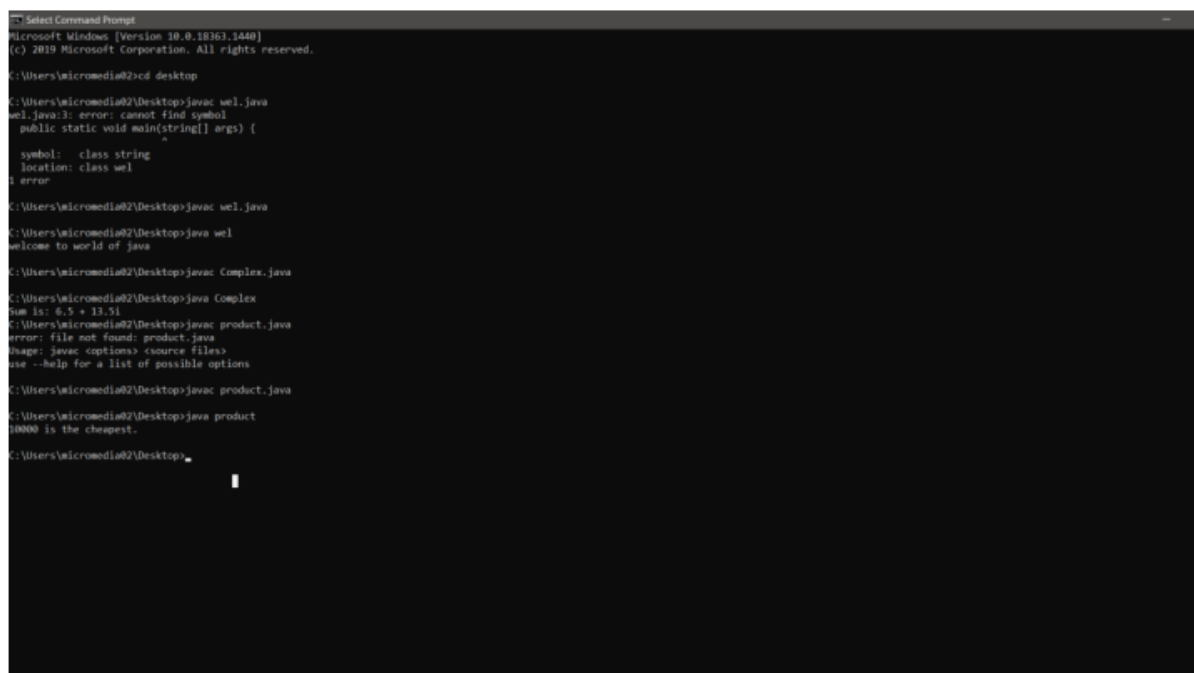
System.out.println(smallest + " is the cheapest.");

}

}

```

output



```

C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac wel.java
wel.java:3: error: cannot find symbol
    public static void main(String[] args) {
                        ^
    symbol:   class String
    location: class wel
1 error
C:\Users\micromedia02\Desktop>javac wel.java
C:\Users\micromedia02\Desktop>java wel
welcome to world of java
C:\Users\micromedia02\Desktop>javac Complex.java
C:\Users\micromedia02\Desktop>java Complex
Sum is: 6.5 + 13.5i
C:\Users\micromedia02\Desktop>javac product.java
error: file not found: product.java
Usage: javac [options] <source files>
Use --help for a list of possible options
C:\Users\micromedia02\Desktop>javac product.java
C:\Users\micromedia02\Desktop>java product
10000 is the cheapest.
C:\Users\micromedia02\Desktop>

```

3. Read a matrix from the console and check whether it is symmetric or not.

```

import java.util.*;

public class mat {

    public static void main(String[] args) {

        Scanner ip=new Scanner(System.in);

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

        int row=ip.nextInt();

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

        int col=ip.nextInt();

        if(row==col)

```

```

{
    System.out.println("Matrix is symmetric ");
}

else

System.out.println("Matrix is not symmetric ");
}

}

```

output

```

C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac matrix.java
C:\Users\micromedia02\Desktop>java matrix
Error: Could not find or load main class matrix
Caused by: java.lang.NoClassDefFoundError: org/springframework/matrix (wrong name: matrix)
C:\Users\micromedia02\Desktop>java matrix
Error: Could not find or load main class matrix
Caused by: java.lang.NoClassDefFoundError: org/springframework/matrix (wrong name: matrix)
C:\Users\micromedia02\Desktop>javac mat.java
C:\Users\micromedia02\Desktop>java mat
Enter the number of row:
10
Enter the number of column:
2
Matrix is not symmetric
C:\Users\micromedia02\Desktop>java mat
Enter the number of row:
3
Enter the number of column:
3
Matrix is symmetric
C:\Users\micromedia02\Desktop>

```

4.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.

```

public class Cpu {
    int price;

    Cpu(int p) {
        this.price = p;
    }

    class Processor {
        int cores;

        String manufacture; Processor(int n, String m) {
            this.cores = n;
            this.manufacture = m;
        }
    }
}

```

```

    }

    void display() {
        System.out.println("No of Cores : " + this.cores);
        System.out.println("Processor manufactures : " + this.manufacture);
    }
}

static class Ram {
    int memory;
    String manufacture;
    Ram(int n, String m) {
        this.memory = n;
        this.manufacture = m;
    }
    void display() {
        System.out.println("Memory Size : " + this.memory);
        System.out.println("Memory manufactures : " + this.manufacture);
    }
}

void display() {
    System.out.println("Price of CPU : " + this.price);
}

public static void main(String[] args) {
    Cpu intel = new Cpu(30000);
    Cpu.Processor i_processor = intel.new Processor(7, "intel");
    Cpu.Ram i_ram = new Ram(1030, "hp");
    intel.display();
    i_processor.display();
    i_ram.display();
}
}

```

output

```
.\Users\micromedia2\Desktop>javac Cpu.java
.\Users\micromedia2\Desktop>java Cpu
Price of CPU : 30000
No. of Cores : 7
Processor manufactures : intel
Memory Size : 16384
Memory manufactures : hp
.\Users\micromedia2\Desktop>
```

5: Area of different shapes using overloaded functions

```
public class ShapeA {
    int area(int side)
    {
        return side*side;
    }
    int area(int l,int b)
    {
        return l*b;
    }
    double area(double b,double h)
    {
        return (0.5*(b*h));
    }
    double area(double r)
    {
        return (3.14*r*r);
    }
    public static void main(String[] args)
    {
```

```

ShapeA obj=new ShapeA();

System.out.println("Area of Square: "+obj.area(5));

System.out.println("Area of Rectangle: "+obj.area(5,4));

System.out.println("Area of Triangle:"+obj.area(5.5,2.1));

System.out.println("Area of Circle: "+obj.area(5.7));

}

}

```

output

```

C:\Users\micromedia2\Desktop>java Shape
Error: Could not find or load main class Shape
Caused by: java.lang.NoClassDefFoundError: sample/Shape (wrong name: Shape)

C:\Users\micromedia2\Desktop>java ShapeA
Area of Square: 25
Area of Rectangle: 20
Area of Triangle: 5.775
Area of Circle: 102.0186
C:\Users\micromedia2\Desktop>

```

6: Create a class 'Employee' with data members Empid, Name, Salary, Address and constructors to initialize the data members. Create another class 'Teacher' that inherit the properties of class employee and contain its own data members department, Subjects taught and constructors to initialize these data members and also include display function to display all the data members. Use array of objects to display details of N teachers.

```

import java.util.*;

class Employee {

int empid;

String name,address;

double salary;

```



```

public Employee(int empid, String name, String address, double salary) {
    this.empid = empid;
    this.name = name;
    this.address = address;
    this.salary = salary;
}
}

public class Teacher extends Employee
{
    String subject,department;

    public Teacher(int empid, String name, String address, double salary,String
    department,String subject ) {
        super(empid, name, address, salary);
        this.subject = subject;
        this.department = department;
    }

    void display()
    {
        System.out.println("Employee id : "+this.empid+" Name : "+this.name+" Salary :
        "+this.salary+" Address : "+this.address+" department : "+this.department+"
        Subjects : "+this.subject);
    }

    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);

        int n;

        System.out.println("Enter number of Teachers : ");

        n=sc.nextInt();

        Teacher obj[]=new Teacher[n];

        for(int i=0;i<n;i++) {
            int j = i+1;

            System.out.print("Enter Employee id of teacher "+j+" : ");

```

```

int Empid = sc.nextInt();

System.out.print("Enter Name of teacher "+j+" : ");

String Name = sc.next();

System.out.print("Enter Salary of teacher "+j+" : ");

double Salary = sc.nextDouble();

System.out.print("Enter Address of teacher "+j+" : ");

String Address = sc.next();

System.out.print("Enter department of teacher "+j+" : ");

String department =sc.next();

System.out.print("Enter Subjects of teacher "+j+" : ");

String Subjects =sc.next();

obj[i] = new Teacher(Empid, Name, Address, Salary, department, Subjects);

}

System.out.println("Teacher's List is \n");

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

obj[i].display();

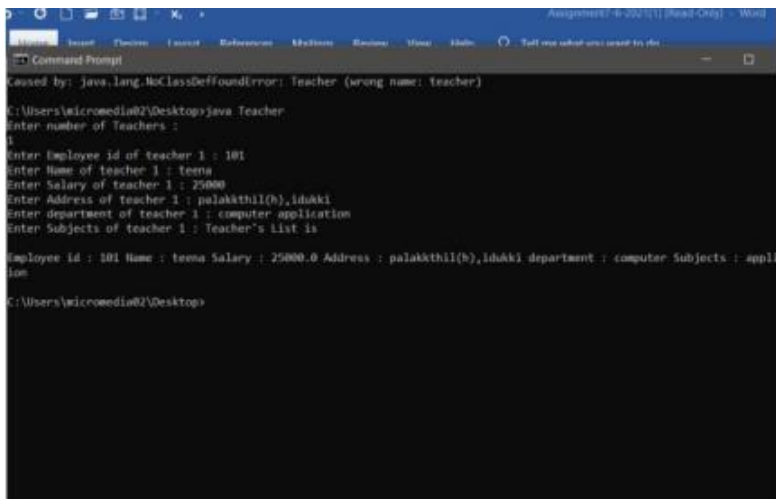
}

}

}

```

output



```

C:\Users\micromedia02\Desktop>java Teacher
Caused by: java.lang.NoSuchMethodError: Teacher (wrong name: Teacher)
C:\Users\micromedia02\Desktop>java Teacher
Enter number of Teachers :
1
Enter Employee id of teacher 1 : 101
Enter Name of teacher 1 : teena
Enter Salary of teacher 1 : 25000
Enter Address of teacher 1 : palakkthil(h), idukki
Enter department of teacher 1 : computer application
Enter Subjects of teacher 1 : Teacher's List is

Employee id : 101 Name : teena Salary : 25000.0 Address : palakkthil(h), idukki department : computer Subjects : appli
ion
C:\Users\micromedia02\Desktop>

```

7: 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 also contain constructors and methods to display the data members. Use array of objects to display details of N teachers.

```
import java.util.Scanner;

class Person
{
    String name,gender,address;
    int age;
    public Person(String name, String gender, String address, int age) {
        super();
        this.name = name;
        this.gender = gender;
        this.address = address;
        this.age = age;
    }
}

class Employee extends Person {
    int empid;
    String company_name,qualification;
    double salary;
    public Employee(String name, String gender, String address, int age, int empid,
        String company_name,
        String qualification, double salary) {
        super(name, gender, address, age);
        this.empid = empid;
```

```
this.company_name = company_name;

this.qualification = qualification;

this.salary = salary;
}

}

class Teacher extends Employee
{
String subject,department;

int teacherid;

public Teacher(String name, String gender, String address, int age, int empid,
String company_name,
String qualification, double salary, String subject, String department, int
teacherid) {
super(name, gender, address, age, empid, company_name, qualification, salary);
this.subject = subject;
this.department = department;
this.teacherid = teacherid;
}

void display()
{
System.out.println("Personal details are");

System.out.println(" Name : "+this.name+" Gender : "+this.gender+" Age
:"+this.age);

System.out.println("Employee details are");

System.out.println("Empid : "+this.empid + " company_name :
"+this.company_name+" Salary : "+this.salary+" Address : "+this.address+"
qualification : "+this.qualification);

System.out.println("Teacher's details are");

System.out.println(" teacherid : "+this.teacherid+ " department :
"+this.department+" Subjects : "+this.subject);
```

}

}

```
public class Main {

public static void main(String[] args) {

Scanner s=new Scanner(System.in);

int n;

System.out.println("Enter number of Teachers : ");

n=s.nextInt();

Teacher obj[]=new Teacher[n];

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

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

String nam1=s.next();

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

String gen1=s.next();

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

String adr1=s.next();

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

int age1=s.nextInt();

System.out.println("Enter the Employee id: ");

int id1=s.nextInt();

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

String cname1=s.next();

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

double sal1=s.nextDouble();

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

String qu1=s.next();

System.out.println("Enter the Teacher id: ");

int tid1=s.nextInt();

System.out.println("Enter the Department:");
```

```

String dept1=s.next();

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

String sub1=s.next();


obj[i]=new

Teacher(nam1,gen1,adr1,age1,id1,cname1,qu1,sal1,sub1,dept1,tid1);

}


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

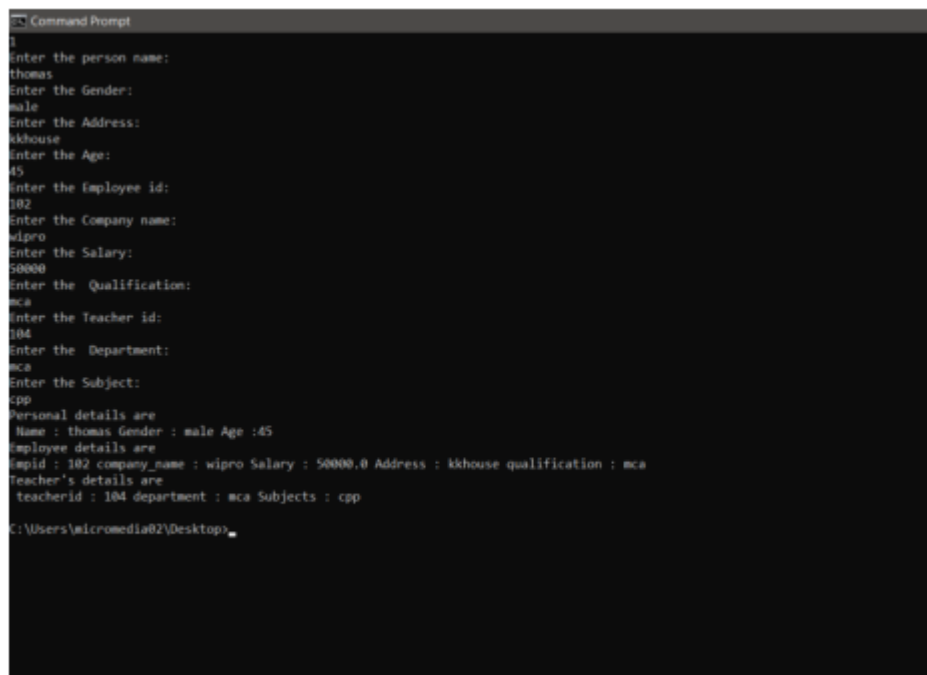
obj[i].display();

}

}

```

output



```

C:\Command Prompt
1
Enter the person name:
thomas
Enter the Gender:
male
Enter the Address:
kkhouse
Enter the Age:
45
Enter the Employee id:
102
Enter the Company name:
wipro
Enter the Salary:
50000
Enter the Qualification:
mca
Enter the Teacher id:
104
Enter the Department:
mca
Enter the Subject:
cpp
Personal details are
Name : thomas Gender : male Age :45
Employee details are
Empid : 102 company_name : wipro Salary : 50000.0 Address : kkhouse qualification : mca
Teacher's details are
Teacherid : 104 department : mca Subjects : cpp
C:\Users\micromedia02\Desktop>

```

8: Write a program has class Publisher, Book, Literature and Fiction. Read the information and print the details of books from either the category, using inheritance.

```
import java.util.Scanner;

class Publisher {
    String Pubname;

    Publisher()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter publisher name");
        Pubname=s.next();
    }
}

class Book extends Publisher
{
    String title, author;
    int price;

    Book()
    {
        Scanner s=new Scanner(System.in);
        System.out.println("Enter Title of the book");
        title=s.next();
        System.out.println("Enter Author's name");
        author=s.next();
        System.out.println("Enter price");
        price=s.nextInt();
    }
}

class Literature extends Book
{

```

```
Literature()
{
    System.out.println("Literature Books");
}

void display()
{
    System.out.println("Publisher name: "+Pubname);
    System.out.println("Title of the book: "+title);
    System.out.println("Author's name: "+author);
    System.out.println("Price: "+price);
}
}

class Fiction extends Literature
{
    Fiction()
    {
        System.out.println("Friction Books");
    }

    void display()
    {
        super.display();
    }

    public static void main(String args[])
    {
        int n;

        Scanner s=new Scanner(System.in);

        System.out.println("Enter the No of literature book: ");
        int a=s.nextInt();

        Literature L[]=new Literature[a];
```

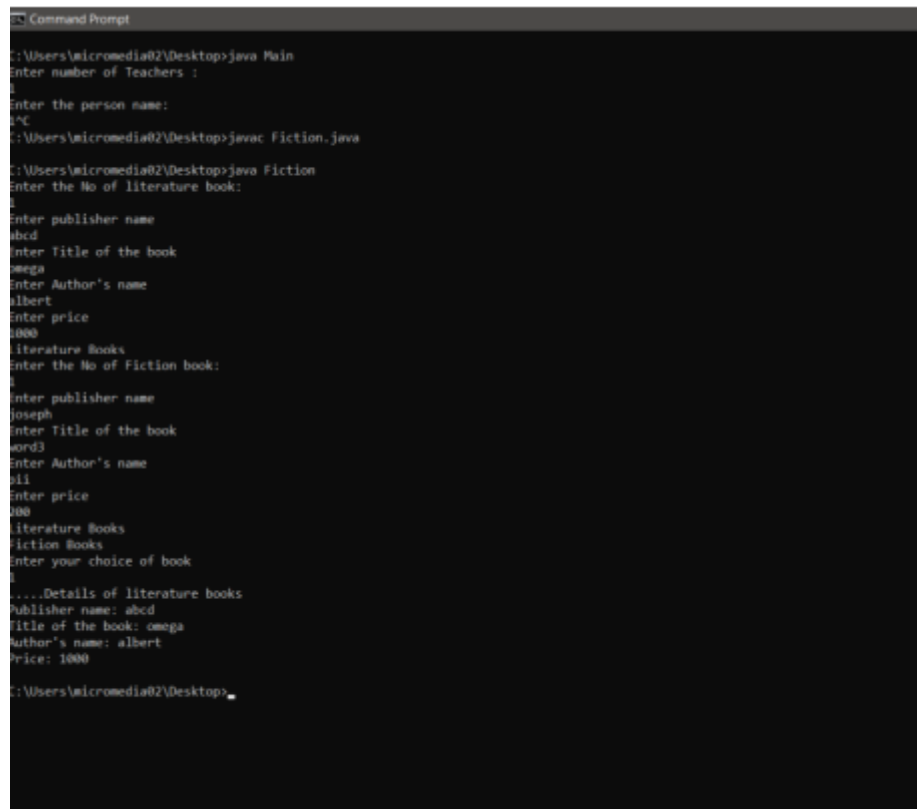


```
for(int i=0;i<a;i++)
{
    L[i]=new Literature();
}

System.out.println("Enter the No of Fiction book: ");
int b=s.nextInt();
Fiction F[]=new Fiction[b];
for(int i=0;i<b;i++)
{
    F[i]=new Fiction();
}
int no;
System.out.println("Enter your choice of book");
no=s.nextInt();
int type =no;
switch (no)
{
    case 1:
        System.out.println(".....Details of literature books");
        for(int i=0;i<a;i++)
            L[i].display();
        break;
    case 2:
        System.out.println(".....Details of fiction books");
        for(int i=0;i<b;i++)
            F[i].display();
        break;
    default:
        System.out.println("Wrong input");
}
```

```
}  
  
}
```

output



```
C:\Users\micromedia02\Desktop>java Main  
Enter number of Teachers :  
1  
Enter the person name:  
nC  
C:\Users\micromedia02\Desktop>javac Fiction.java  
C:\Users\micromedia02\Desktop>java Fiction  
Enter the No of literature book:  
1  
Enter publisher name  
abcd  
Enter Title of the book  
omega  
Enter Author's name  
albert  
Enter price  
1000  
Literature Books  
Enter the No of Fiction book:  
1  
Enter publisher name  
joseph  
Enter Title of the book  
word3  
Enter Author's name  
oli  
Enter price  
200  
Literature Books  
Fiction Books  
Enter your choice of book  
1  
....Details of literature books  
Publisher name: abcd  
Title of the book: omega  
Author's name: albert  
Price: 1000  
C:\Users\micromedia02\Desktop>
```

9: Create classes Student and sports. Create another class result inherited from student and sports. Display the academic and sports score of a student.

interface student

```
{  
  
void stresultt();  
  
}
```

interface sports

```
{  
  
void spresult();  
  
}
```

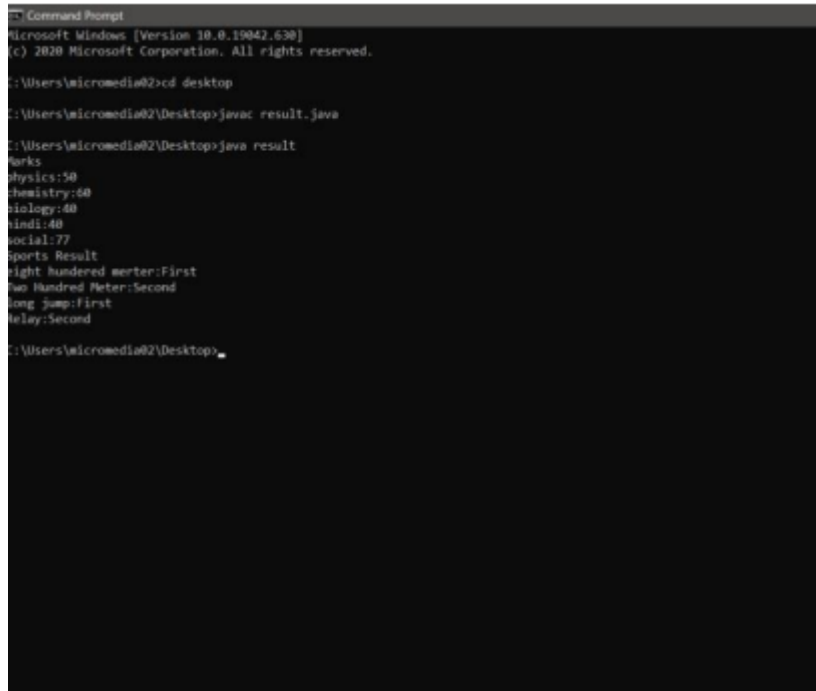
class result implements student,sports{

public void spresult()

```
{
```

```
String eighthundred="First";
String twohundred="Second";
String longjump="First";
String relay="Second";
System.out.println("Sports Result");
System.out.println("eight hundred merter:"+ eighthundred);
System.out.println("Two Hundred Meter:"+twohundred);
System.out.println("long jump:"+longjump);
System.out.println("Relay:"+relay);
}
public void stresult()
{
int physics=50;
int chemistry=60;
int biology=40;
int hindi=40;
int social=77;
System.out.println("Marks");
System.out.println("physics:"+physics);
System.out.println("chemistry:"+chemistry);
System.out.println("biology:"+biology);
System.out.println("hindi:"+hindi);
System.out.println("social:"+social);
}
public static void main(String[] args)
{
result r = new result(); r.stresult();
r.spresult();
}
}
```

output



```
Microsoft Windows [Version 10.0.19042.630]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac result.java
C:\Users\micromedia02\Desktop>java result
Marks
physics:50
chemistry:60
biology:60
hindi:40
social:77
sports Result
Eight hundred meter:First
Two Hundred Meter:Second
Long Jump:First
Relay:Second
C:\Users\micromedia02\Desktop>
```

10:Create an interface having prototype 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.

```
import java.util.Scanner;

interface Shape
{
    void input();
    void area();
    void perimeter();
}

class Circle implements Shape
{
    int r = 0;

    double pi = 3.14, ar = 0, per=0;

    public void input()
    { Scanner s = new Scanner(System.in); System.out.print("Enter radius of circle:");

    r= s.nextInt();

    }
```

```
public void area()
{
    ar = pi * r * r;
    System.out.println("Area of circle:"+ar);
}

public void perimeter()
{
    per = 2 * pi * r;
    System.out.println("Perimeter of circle:"+per);
}

}

class Rectangle implements Shape
{
    int l = 0, b = 0;
    double ar,per;
    public void input()
    { Scanner s = new Scanner(System.in);
      System.out.print("Enter length of rectangle:");
      l = s.nextInt();
      System.out.print("Enter breadth of rectangle:");
      b = s.nextInt();
    }
    public void area()
    {
        ar = l * b;
        System.out.println("Area of rectangle:"+ar);
    }
    public void perimeter()
    {
        per = 2 * (l + b);
        System.out.println("Perimeter of rectangle:"+per);
    }
}
```

```
}  
}  
  
public class shapes  
{  
  
    public static void main(String[] args)  
    { int n;  
  
        Scanner s = new Scanner(System.in);  
  
        Rectangle obj1 = new Rectangle();  
  
        Circle obj2 = new Circle(); System.out.println("1.Area of circle");  
  
        System.out.println("2.Perimeter of circle");  
  
        System.out.println("3.Area of rectangle");  
  
        System.out.println("4.Perimeter of rectangle");  
  
        System.out.println("Enter your option:");  
  
        n= s.nextInt();  
  
        switch(n) {  
  
            case 1:  
  
                obj2.input();  
  
                obj2.area();  
  
                break;  
  
            case 2:  
  
                obj2.input();  
  
                obj2.perimeter();  
  
                break;  
  
            case 3:  
  
                obj2.input();  
  
                obj2.area();  
  
                break;  
  
            case 4:  
  
                obj2.input();  
  
                obj2.perimeter();  
  
                break;
```

default:

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

```
}
```

```
}
```

```
}
```

output

```
C:\Users\micromedia02\Desktop>javac shapes.java
C:\Users\micromedia02\Desktop>java shapes
1.Area of circle
2.Perimeter of circle
3.Area of rectangle
4.Perimeter of rectangle
Enter your option:
1
Enter radius of circle:5
Area of circle:78.5
C:\Users\micromedia02\Desktop>
```

10:Prepare bill with the given format using calculate method from interface.

Order No.Date Productid name quantity price total

101 A 2 25 50 102 B 1 100 100

Net.Amount 150

interface bill

```
{
```

```
int productdetails();
```

```
}
```

```
class product1 implements bill{
```

```
int id = 101,quantity= 2,unit=25,total=0; String name="A";
```

```
public int productdetails()
```

```
{
```

```
total = quantity * unit;
```

```
System.out.println("Product Id :"+id);
```

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

```
System.out.println("Quantity :"+quantity);
```

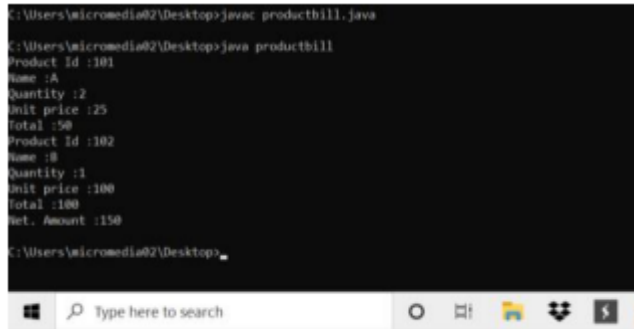
```
System.out.println("Unit price :"+unit);
```

```
System.out.println("Total :"+total);
return(total);
}
}

class product2 implements bill{
int id = 102,quantity= 1,unit=100,total=0;
String name="B";
public int productdetails()
{
total = quantity * unit;
System.out.println("Product Id :"+id);
System.out.println("Name :"+name);
System.out.println("Quantity :"+quantity);
System.out.println("Unit price :"+unit);
System.out.println("Total :"+total);
return(total);
}
}

public class productbill
{
public static void main(String[] args)
{
product1 p1 = new product1();
product2 p2 = new product2();
int t1= p1.productdetails();
int t2= p2.productdetails();
int t3=t1+t2;
System.out.println("Net. Amount :"+t3);
}
}
```


output



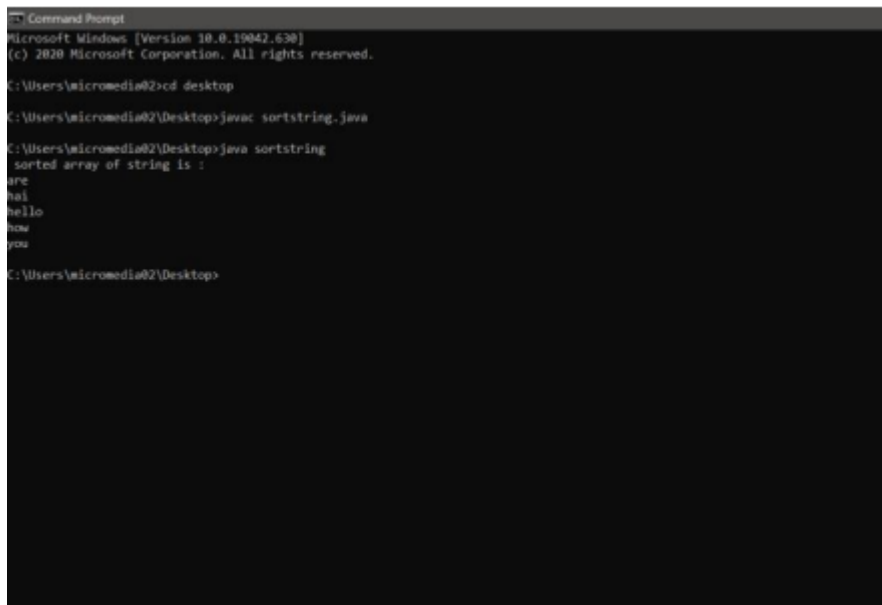
```
C:\Users\micromedia02\Desktop>javac productbill.java
C:\Users\micromedia02\Desktop>java productbill
Product Id :101
Name :A
Quantity :2
Unit price :25
Total :50
Product Id :102
Name :B
Quantity :1
Unit price :100
Total :100
Net. Amount :150
C:\Users\micromedia02\Desktop>
```

11.program to sort strings

```
public class sortstring{
    public static void main(String[] args)
    {
        String names[]={"hai","hello","how","are","you"};
        String temp;
        int n= names.length;
        int i;
        int j;
        for(i=0;i<n;i++)
        {
            for(j=i+1;j<n;j++)
            {
                if(names[i].compareTo(names[j])>0)
                {
                    temp=names[i];
                    names[i]=names[j];
                    names[j]=temp;
                }
            }
        }
        System.out.println(" sorted array of string is :");
    }
}
```

```
for(i=0;i<n;i++)  
{  
    System.out.println(names[i]);  
}  
}  
}
```

output



```
Microsoft Windows [Version 10.0.19042.630]  
(c) 2020 Microsoft Corporation. All rights reserved.  
  
C:\Users\micromedia02>cd desktop  
  
C:\Users\micromedia02\Desktop>javac sortstring.java  
  
C:\Users\micromedia02\Desktop>java sortstring  
sorted array of string is :  
are  
hai  
hello  
how  
you  
  
C:\Users\micromedia02\Desktop>
```

12.search an element in an array

```
import java.util.*;  
  
public class search{  
    public static void main(String[] args)  
    {  
        int n,i,b,flag=0;  
        Scanner s=new Scanner(System.in);  
        System.out.println("enter the number of elements for the array :");  
        n=s.nextInt();  
        int a[]=new int[n];  
        System.out.println("enter the elements of the array :");  
        for(i=0;i<n;i++)
```

```
{
a[i]=s.nextInt();
}

System.out.println("enter the element want to search :");

b=s.nextInt();

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

{
if(a[i]==b)

{
flag=1;

break;
}

else

{
flag=0;
}
}

if(flag==1)

{

System.out.println("element found at position :"+(i+1));

}

else

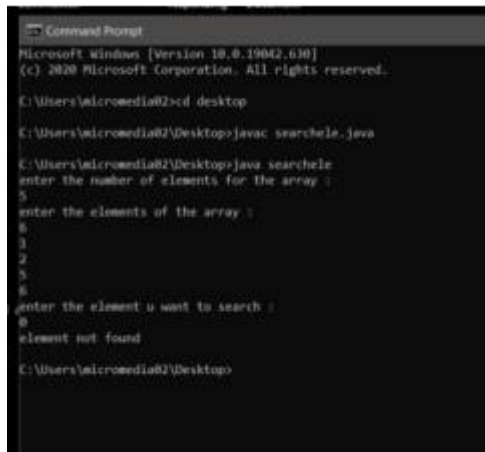
{

System.out.println("element not found");

}

}
```

output



```
Command Prompt
Microsoft Windows [Version 10.0.19042.630]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\micromedia02>cd desktop

C:\Users\micromedia02\Desktop>javac searchele.java

C:\Users\micromedia02\Desktop>java searchele
enter the number of elements for the array :
5
enter the elements of the array :
6
1
2
5
6
enter the element u want to search :
0
element not found

C:\Users\micromedia02\Desktop>
```

13.perform string manipulations

```
public class Sample_String{

    public static void main(String[] args){

        String str_Sample = "spiderman";

        System.out.println("Length of String: " + str_Sample.length());

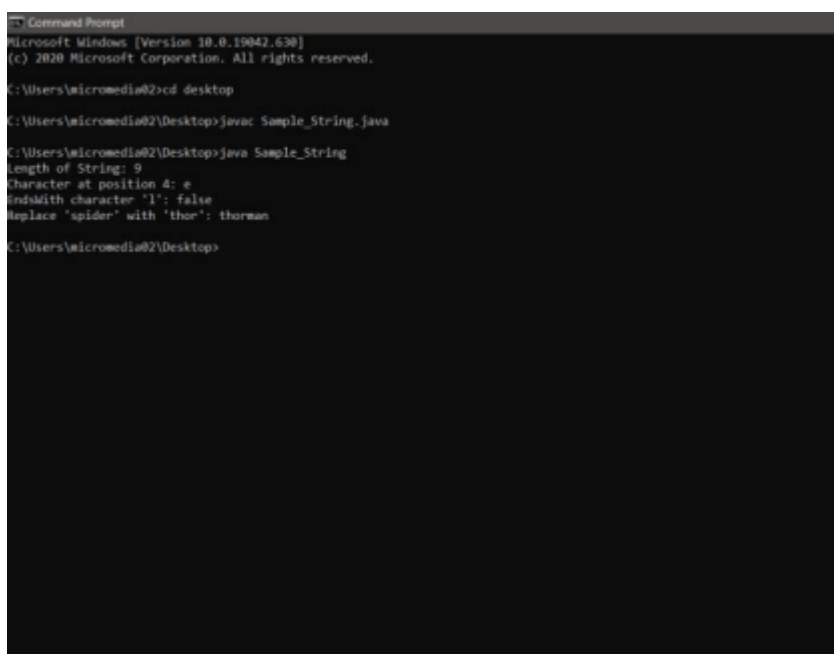
        System.out.println("Character at position 4: " + str_Sample.charAt(4));

        System.out.println("EndsWith character 'l': " + str_Sample.endsWith("l"));

        System.out.println("Replace 'spider' with 'thor': " + str_Sample.replace("spider", "thor"));

    }
}
```

output



```
Command Prompt
Microsoft Windows [Version 10.0.19042.630]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\micromedia02>cd desktop

C:\Users\micromedia02\Desktop>javac Sample_String.java

C:\Users\micromedia02\Desktop>java Sample_String
Length of String: 9
Character at position 4: e
EndsWith character 'l': false
Replace 'spider' with 'thor': thorman

C:\Users\micromedia02\Desktop>
```

14:..Java program to create generic stack and do the push and pop operation

A stack class is provided by the Java collection framework and it implements the Stack data structure. The stack implements LIFO i.e. Last In First Out. This means that the elements pushed last are the ones that are popped first.

- 1. push() Method adds element x to the stack.**
- 2. pop() Method removes the last element of the stack.**
- 3. top() Method returns the last element of the stack.**
- 4. empty() Method returns whether the stack is empty or not.**

```
import java.io.*;
import java.util.*;

public class Example {
    public static void main (String[] args) {
        Stack<Integer> s = new Stack<Integer>();

        s.push(5);

        s.push(1);

        s.push(9);

        s.push(4);

        s.push(8);

        System.out.print("The stack is: " + s);

        System.out.print("\nThe element popped is: ");

        Integer num1 = (Integer) s.pop();

        System.out.print(num1);

        System.out.print("\nThe stack after pop is: " + s);

        Integer pos = (Integer) s.search(9);

        if(pos == -1)

            System.out.print("\nThe element 9 not found in stack");

        else
```

```
System.out.print("\nThe element 9 is found at position " + pos + " in stack");  
}  
}
```

output

The stack is: [5, 1, 9, 4, 8]

The element popped is: 8

The stack after pop is: [5, 1, 9, 4]

The element 9 is found at position 2 in stack

15:Generic method implement bubble sort

Bubble sort is a simple sorting algorithm. This sorting algorithm is a comparison-based algorithm in which each pair of adjacent elements is compared and the elements are swapped if they are not in order. This algorithm is not suitable for large datasets as its average and worst case complexity is of $O(n^2)$ where n is the number of items.

```
public class BubbleSort {  
    static void bubbleSort(int[] arr) {  
        int n = arr.length;  
        int temp = 0;  
        for(int i = 0; i < n; i++) {  
            for(int j=1; j < (n-i); j++) {  
                if(arr[j-1] > arr[j]) {  
                    temp = arr[j-1];  
                    arr[j-1] = arr[j];  
                    arr[j] = temp;  
                }  
            }  
        }  
    }  
}
```

```
public static void main(String[] args) {  
    int arr[] = { 2, 5, -2, 6, -3, 8, 0, -7, -9, 4 };  
    System.out.println("Array Before Bubble Sort");  
    for(int i = 0; i < arr.length; i++) {  
        System.out.print(arr[i] + " ");  
    }  
    System.out.println();  
    bubbleSort(arr);  
    System.out.println("Array After Bubble Sort");  
    for(int i = 0; i < arr.length; i++) {  
        System.out.print(arr[i] + " ");  
    }  
}  
}
```

Output

Array Before Bubble Sort

2 5 -2 6 -3 8 0 -7 -9 4

Array After Bubble Sort

-9 -7 -3 -2 0 2 4 5 6 8

16. Maintain a list of string using arraylist from a collection of framework, perform builtin operation

The ArrayList class extends AbstractList and implements the List interface. ArrayList supports dynamic arrays that can grow as needed.

Standard Java arrays are of a fixed length. After arrays are created, they cannot grow or shrink, which means that you must know in advance how many elements an array will hold.

Array lists are created with an initial size. When this size is exceeded, the collection is automatically enlarged. When objects are removed, the array may be shrunk.

```
import java.util.*;

public class ArrayListDemo {

    public static void main(String args[]) {

        // create an array list

        ArrayList al = new ArrayList();

        System.out.println("Initial size of al: " + al.size());

        // add elements to the array list

        al.add("C");

        al.add("A");

        al.add("E");

        al.add("B");

        al.add("D");

        al.add("F");

        al.add(1, "A2");

        System.out.println("Size of al after additions: " + al.size());

        // display the array list

        System.out.println("Contents of al: " + al);

        // Remove elements from the array list

        al.remove("F");

        al.remove(2);

        System.out.println("Size of al after deletions: " + al.size());

        System.out.println("Contents of al: " + al);

    }

}
```



```
}
```

output

Initial size of al: 0

Size of al after additions: 7

Contents of al: [C, A2, A, E, B, D, F]

Size of al after deletions: 5

Contents of al: [C, A2, E, B, D]

17: Write a user defined exception class to authentication the user name and password.

```
import java.util.Scanner;

class UsernameException extends Exception {
    public UsernameException(String msg) {
        super(msg);
    }
}

class PasswordException extends Exception {
    public PasswordException(String msg) {
        super(msg);
    }
}

public class checkLogin {
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);
        String username, password;

        System.out.print("Enter username :: ");
        username = s.nextLine();

        System.out.print("Enter password :: ");
        password = s.nextLine();
    }
}
```

```

int length = username.length();

try {
    if(length < 6)
        throw new UsernameException("Username must be greater than 6 characters ???");
    else if(!password.equals("hello"))
        throw new PasswordException("Incorrect password\nType correct password ???");
    else
        System.out.println("Login Successful !!!");
}

catch (UsernameException u) {
    u.printStackTrace();
}

catch (PasswordException p) {
    p.printStackTrace();
}

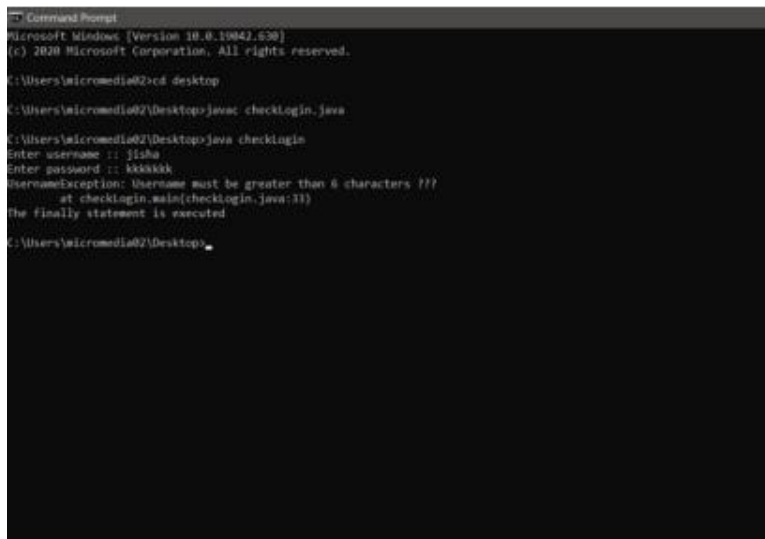
finally {
    System.out.println("The finally statement is executed");
}

}

}

```

output



```

C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac checklogin.java
C:\Users\micromedia02\Desktop>java checklogin
Enter username :: jisha
Enter password :: kkkkkk
UsernameException: Username must be greater than 6 characters ???
    at checklogin.main(checklogin.java:11)
The finally statement is executed
C:\Users\micromedia02\Desktop>_

```

**18 : Find the average of N positive integers raising a user defined exception
for each negative input**

```
import java.util.Scanner;

import java.util.InputMismatchException;

public class TestDemo

{

public static void main(String args[])

{

double total = 0, N, userInput;

Scanner input = new Scanner(System.in);

while (true)

{

System.out.print("Enter how many numbers(N) to calculate average:");

userInput = input.nextDouble();

if (userInput > 0)

{

N = userInput;

break;

}

else

System.out.println("N must be positive.");

}

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

{

while (true)

{

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

try

{

userInput = input.nextDouble();
```

```

total += userInput;

break;
}

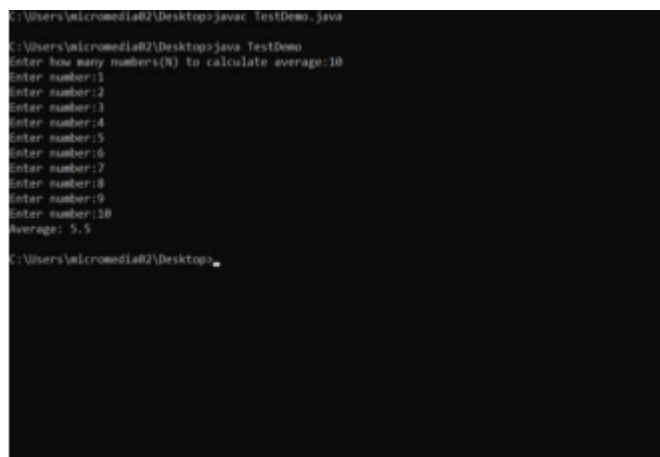
catch (InputMismatchException e)
{
input.nextLine();

System.out.println("Input must be a number. Try again");
}
}
}

System.out.println("Average: "+ total / N);
}
}

```

output



```

C:\Users\micromedia02\Desktop>java TestDemo.java
Enter how many numbers(N) to calculate average:10
Enter number:1
Enter number:2
Enter number:3
Enter number:4
Enter number:5
Enter number:6
Enter number:7
Enter number:8
Enter number:9
Enter number:10
Average: 5.5
C:\Users\micromedia02\Desktop>

```

19: Define 2 classes one for generating multiplication table of 5 and other for displaying

first N prime numbers implement using threads(thread class)

```

class ThreadA extends Thread{

public void run( ) {

int n = 5;

for (int i = 1; i <= 10; ++i)

System.out.println(n + " * " + i +

```

```

" = " + n * i);

System.out.println("Exiting  from Thread A ...");

}

}

class ThreadB extends Thread {

    public void run( ) {

        Scanner sc = new Scanner(System.in);

        int i,n,p,count,flag;

        System.out.println("Enter  the number of prime terms you want!");

        n=sc.nextInt();

        System.out.println("First  "+n+" prime numbers are :-");

        p=2;

        i=1;

        while(i<=n)

        {

            flag=1;

            for(count=2;count<=p-1;count++)

            {

                if(p%count==0) //Will be true if p is not prime

                {

                    flag=0;

                    break; //Loop will terminate if p is not prime

                }

            }

            if(flag==1)

            {

                System.out.print(p+" ");

                i++;

            }

            p++;

        }

```

```

    }

    System.out.println("Exiting  from Thread B ...");

}

}

public class Demonstration_111 {

    public static void main(String args[]) {

        ThreadA a = new ThreadA();

        ThreadB b = new ThreadB();

        a.start();

        b.start();

        System.out.println("... Multithreading is over ");

    }

}

```

20 : Define 2 classes one for generating fibanocci numbers and other for displaying even numbers in a given range.implement using threads(runnable interface)

```

public class Mythread {

    public static void main(String[] args) {

        Runnable r = new Runnable1();

        Thread t = new Thread(r);

        t.start();

        Runnable r2 = new Runnable2();

        Thread t2 = new Thread(r2);

        t2.start();

    }

}

class Runnable2 implements Runnable{

    public void run(){

        for(int i=0;i<11;i++){

            if(i%2 == 1)

                System.out.println(i);

        }

    }

}

```

```

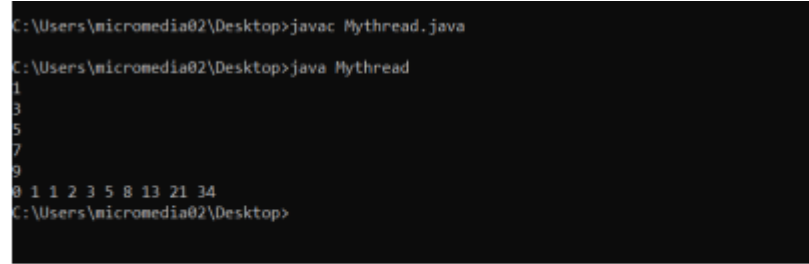
    }
    }
}

class Runnable1 implements Runnable{
    public void run(){
        int n1=0,n2=1,n3,i,count=10;
        System.out.print(n1+" "+n2);//printing 0 and 1

        for(i=2;i<count;++i)//loop starts from 2 because 0 and 1 are already printed
        {
            n3=n1+n2;
            System.out.print(" "+n3);
            n1=n2;
            n2=n3;
        }
    }
}

```

output



```

C:\Users\micromedia02\Desktop>javac Mythread.java
C:\Users\micromedia02\Desktop>java Mythread
0
1
1
2
3
5
8
13
21
34
C:\Users\micromedia02\Desktop>

```

21: Program to draw circle,rectangle,line in applet

```
import java.awt.*;  
import java.applet.*;  
public class line extends Applet  
{  
    public void paint(Graphics g)  
    {  
        g.drawLine(100,10,250, 150);  
        g.drawLine(100,150,150,10);  
        g.setColor(Color.black);  
        g.drawRect(300, 50, 100, 100);  
        g.setColor(Color.black);  
        g.drawOval(500,30,100,100);  
    }  
}
```

.html code

```
<html>  
<head>  
</head>  
<body>  
<applet code = "line.class" width = "420" height = "320"></applet>  
</body>  
</html>
```

output



22: Program to find maximum of three numbers using AWT

```
import java.awt.*;
import java.awt.Event;
import java.applet.*;

public class largest extends Applet
{
    TextField Txt1,Txt2,Txt3;

    public void init(){
        Txt1 = new TextField(10);
        Txt2 = new TextField(10);
        Txt3 = new TextField(10);
        add(Txt1);
        add(Txt2);
        add(Txt3);
    }

    public void paint(Graphics g){
        int a, b, c,result;
        String str;

        g.drawString("Enter the numbers ",15,15);

        str=Txt1.getText();
        a=Integer.parseInt(str);
        str=Txt2.getText();
        b=Integer.parseInt(str);
        str=Txt3.getText();
        c=Integer.parseInt(str);
        if (a>=b && a>=c)
        {
            result=a;
        }
        else if(b>=a && b>=c)
        {
```

```

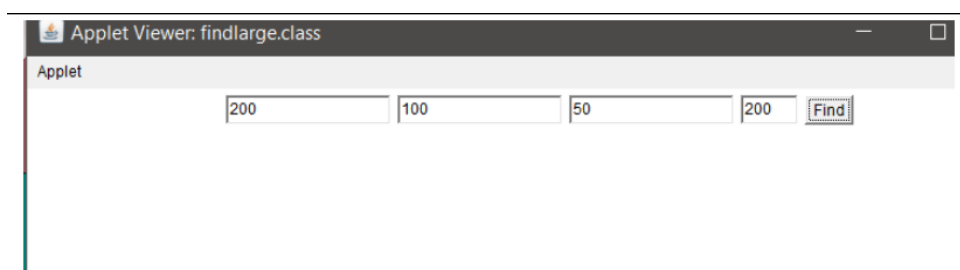
result=b;
}
else
{
result=c;
}
g.drawString("Largest number is "+result,10,70);
}

public boolean action(Event e, Object o){
repaint();
return true;
}
}

html
<html>
<head>
</head>
<body>
<div align="center">
<applet code="largest.class"width="800"height="500">
</applet>
</div>
</body>
</html>

```

output



23: Find the percentage of marks obtained by a student in 5 subject. Display a happy face if he secures above

50% or a sad face if otherwise.

```
import java.awt.*;
import java.awt.event.*;
import java.applet.*;

public class marks extends Applet implements ActionListener {

    public int per = 0;

    Label l1 = new Label("enter Marks of Subject 1: ");
    Label l2 = new Label("enter Marks of Subject 2: ");
    Label l3 = new Label("enter Marks of Subject 3: ");
    Label l4 = new Label("enter Marks of Subject 4: ");
    Label l5 = new Label("enter Marks of Subject 5: ");
    Label l6 = new Label("Total Percentage: ");

    TextField t1 = new TextField(10);
    TextField t2 = new TextField(10);
    TextField t3 = new TextField(10);
    TextField t4 = new TextField(10);
    TextField t5 = new TextField(10);
    TextField t6 = new TextField(10);

    Button b1 = new Button("CALCULATE PERCENTAGE");

    public marks()
    {
        l1.setBounds(50, 100, 280, 20);
        l2.setBounds(50, 150, 280, 20);
        l3.setBounds(50, 200, 280, 20);
        l4.setBounds(50, 250, 280, 20);
        l5.setBounds(50, 300, 280, 20);
        l6.setBounds(50, 350, 280, 20);

        t1.setBounds(200, 100, 300, 20);
        t2.setBounds(200, 150, 300, 20);
```

```

t3.setBounds(200, 200, 300, 20);

t4.setBounds(200, 250, 300, 20);

t5.setBounds(200, 300, 300, 20);

t6.setBounds(200, 350, 300, 20);

b1.setBounds(200,400, 200, 20);

GridLayout g1 = new GridLayout(20, 2, 5, 5);

setLayout(g1);

add(l1);

add(t1);

add(l2);

add(t2);

add(l3);

add(t3);

add(l4);

add(t4);

add(l5);

add(t5);

add(l6);

add(t6);

add(b1);

b1.addActionListener(this);

}

@Override

public void actionPerformed(ActionEvent e) {

// TODO Auto-generated method stub

int m1 = Integer.parseInt(t1.getText());

int m2= Integer.parseInt(t2.getText());

int m3= Integer.parseInt(t3.getText());

int m4= Integer.parseInt(t4.getText());

int m5= Integer.parseInt(t5.getText());

if(e.getSource()==b1)

```

```
{
int add=m1+m2+m3+m4+m5;
per=add/5;
t6.setText(String.valueOf(per)+" %");
repaint();
}
}

public void paint(Graphics g)
{
if(per>=50)
{
g.setColor(Color.yellow);
g.drawOval(80, 700, 150, 150);
g.fillOval(80, 700, 150, 150);
g.setColor(Color.BLACK);
g.fillOval(120, 740, 15, 15);
g.fillOval(170, 740, 15, 15);
g.drawArc(130, 800, 50, 20, 180, 180);
}

else if(per>0 && per<50)
{
g.setColor(Color.yellow);
g.drawOval(80, 700, 150, 150);
g.fillOval(80, 700, 150, 150);
g.setColor(Color.BLACK);
g.fillOval(120, 740, 15, 15);
g.fillOval(170, 740, 15, 15);
g.drawArc(130,820,50,20,0,180);
}
}

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

```
new marks();
```

```
}
```

```
}
```

Html

```
<html>
```

```
<head>
```

```
</head>
```

```
<body>
```

```
<div align="center">
```

```
<applet code="marks.class"width="800"height="500">
```

```
</applet>
```

```
</div>
```

```
</body>
```

```
</html>
```

output

Applet Viewer: marks.class

Applet

enter Marks of Subject 1:

44

enter Marks of Subject 2:

45

enter Marks of Subject 3:

46

enter Marks of Subject 4:

47

enter Marks of Subject 5:

48

Total Percentage:

45 %

CALOUKATE PERCENTAGE



Applet started

Applet Viewer: marks.class

Applet

enter Marks of Subject 1:

55

enter Marks of Subject 2:

55

enter Marks of Subject 3:

75

enter Marks of Subject 4:

85

enter Marks of Subject 5:

85

Total Percentage:

75 %

CALCULATE PERCENTAGE



24:Using 2D graphics commands in an applet ,construct a house .On mouse click event change the color of the

door from blue to red.

```
import java.awt.*;
import java.applet.*;
import java.awt.event.*;

public class house extends Applet implements MouseListener, Runnable {
    private Color doorColor = Color.WHITE;

    public void paint(Graphics gp) {
        int[] i = { 150, 300, 225 };
        int[] j = { 150, 150, 25 };
        gp.drawRect(150, 150, 150, 200);
        gp.drawOval(200, 75, 50, 50);
        gp.drawPolygon(i, j, 3);
        gp.setColor(doorColor);
        gp.fillRect(200, 200, 50, 150);
        gp.setColor(Color.BLACK);
        gp.drawRect(200, 200, 50, 150);
    }

    public void init() {
```

```
this.setSize(200, 200);  
addMouseListener(this);  
}  
public void run() {  
    while (true) {  
        repaint();  
        try {  
            Thread.sleep(17);  
        } catch (InterruptedException e) {  
            e.printStackTrace();  
        }  
    }  
}  
public void mouseClicked(MouseEvent e) {  
    int x = e.getX(), y = e.getY();  
    if (x >= 200 && x <= 250 && y >= 200 && y <= 350)  
        doorColor = Color.RED;  
    else  
        doorColor = Color.BLUE;  
    repaint();  
    System.out.println("Mouse Position : X=" + x + " Y=" + y + "");  
}  
public void mousePressed(MouseEvent e) {  
}  
public void mouseReleased(MouseEvent e) {  
}  
public void mouseEntered(MouseEvent e) {  
}  
public void mouseExited(MouseEvent e) {  
}  
}
```


Html code

```
<html>  
<head>  
</head>  
<body>  
<div align="center">  
<applet code="house.class" width="800" height="500">  
</applet>  
</div>  
</body>  
</html>
```

output



25:Implement a simple calculator using AWT components

```
import java.awt.*;

import java.awt.event.*;

import java.applet.*;

public class calc extends Applet implements ActionListener {

    Frame f = new Frame();

    Label l1 = new Label("enter number");

    Label l2 = new Label("enter number");

    Label l3 = new Label("result");

    TextField t1 = new TextField(10);

    TextField t2 = new TextField(10);

    TextField t3 = new TextField(10);

    Button b1 = new Button("ADD");

    Button b2 = new Button("SUB");

    Button b3 = new Button("MUL");

    Button b4 = new Button("DIV");

    calc() {

        l1.setBounds(50, 100, 100, 20);

        l2.setBounds(50, 100, 100, 20);

        l3.setBounds(50, 100, 100, 20);

        t1.setBounds(200, 100, 100, 20);

        t2.setBounds(250, 150, 100, 20);

        t3.setBounds(300, 200, 100, 20);

        b1.setBounds(50, 250, 50, 20);

        b2.setBounds(110, 250, 50, 20);

        b3.setBounds(170, 250, 50, 20);

        b4.setBounds(230, 250, 50, 20);

        f.add(l1);

        f.add(t1);

        f.add(l2);

        f.add(t2);
```

```
f.add(l3);  
f.add(t3);  
f.add(b1);  
f.add(b2);  
f.add(b3);  
f.add(b4);  
  
b1.addActionListener(this);  
b2.addActionListener(this);  
b3.addActionListener(this);  
b4.addActionListener(this);  
  
f.setLayout(null);  
f.setVisible(true);  
f.setSize(500, 500);  
}  
  
public void actionPerformed(ActionEvent e) {  
    int i = Integer.parseInt(t1.getText());  
    int j = Integer.parseInt(t2.getText());  
    if (e.getSource() == b1) {  
        t3.setText(String.valueOf(i + j));  
    }  
    if (e.getSource() == b2) {  
        t3.setText(String.valueOf(i - j));  
    }  
    if (e.getSource() == b3) {  
        t3.setText(String.valueOf(i * j));  
    }  
    if (e.getSource() == b4) {  
        t3.setText(String.valueOf(i / j));  
    }  
}  
  
public static void main(String args[]) {
```

```
new calc();  
}  
}
```

output

enter number

2

3

-1

ADD

SUB

MUL

DIV

26: Develop a program that has a choice component which contains the names of shapes such as rectangle

,triangle.square and circle,Draw the corresponding shapes for given parameters as per user's choice.

```
import java.applet.Applet;  
import java.awt.*;  
import java.awt.Graphics;  
import java.awt.event.*;  
public class figchoice extends Applet implements ItemListener {  
    Choice ch;  
    int x1[] = {50,120,220,20};  
    int y1[] = {50,120,20,20};
```

```
int n=4;

int Selection;

public void init()
{
    ch = new Choice();
    ch.addItem("Select a Shape");
    ch.addItem("Rectangle");
    ch.addItem("Triangle");
    ch.addItem("Square");
    ch.addItem("Circle");
    add(ch);
    ch.addItemListener(this);
}

public void itemStateChanged (ItemEvent e)
{
    Selection = ch.getSelectedIndex();
    repaint();
}

public void paint(Graphics g)
{
    super.paint(g);
    if (Selection == 1)
    {
        g.drawRect(50,50,100,150);
    }
    if (Selection == 2)
    {
        g.drawPolygon(x1,y1,n);
    }
    if (Selection == 3)
    {

```

```
g.drawRect(50,50,100,100);
```

```
}
```

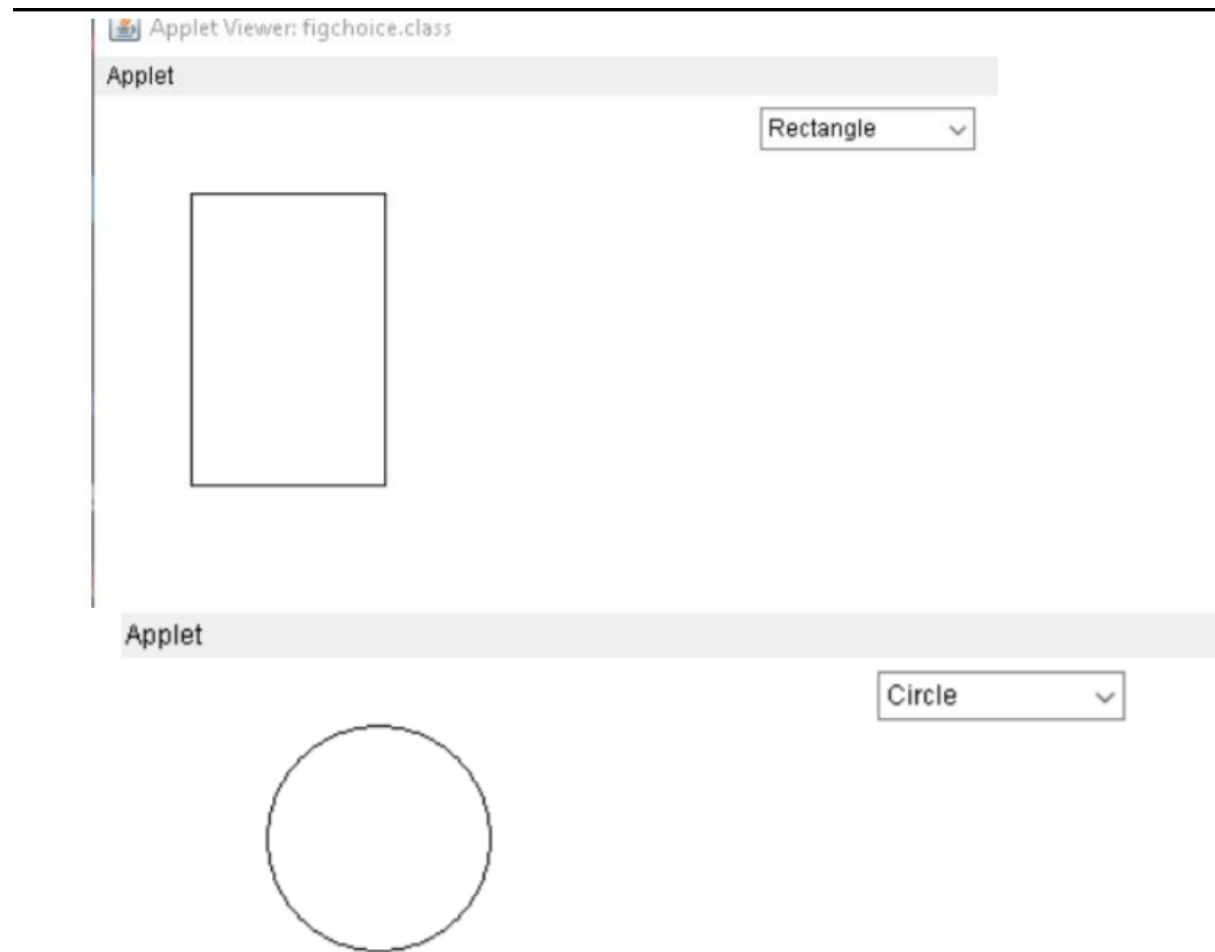
```
if (Selection == 4)
```

```
{
```

```
g.drawOval(70,30,100,100);
```

```
}
```

output





27. Maintain a list of Strings using ArrayList from collection framework, perform built-in

import java.util.*;

class arrayjava{

public static void main(String args[]){

ArrayList<String> alist=new ArrayList<String>();

alist.add("appu");

alist.add("ammu");

alist.add("minnu");

alist.add("thomu");

alist.add("pinky");

alist.add("Tom");

//displaying elements

System.out.println(alist);

//Adding "appu" at the fourth position

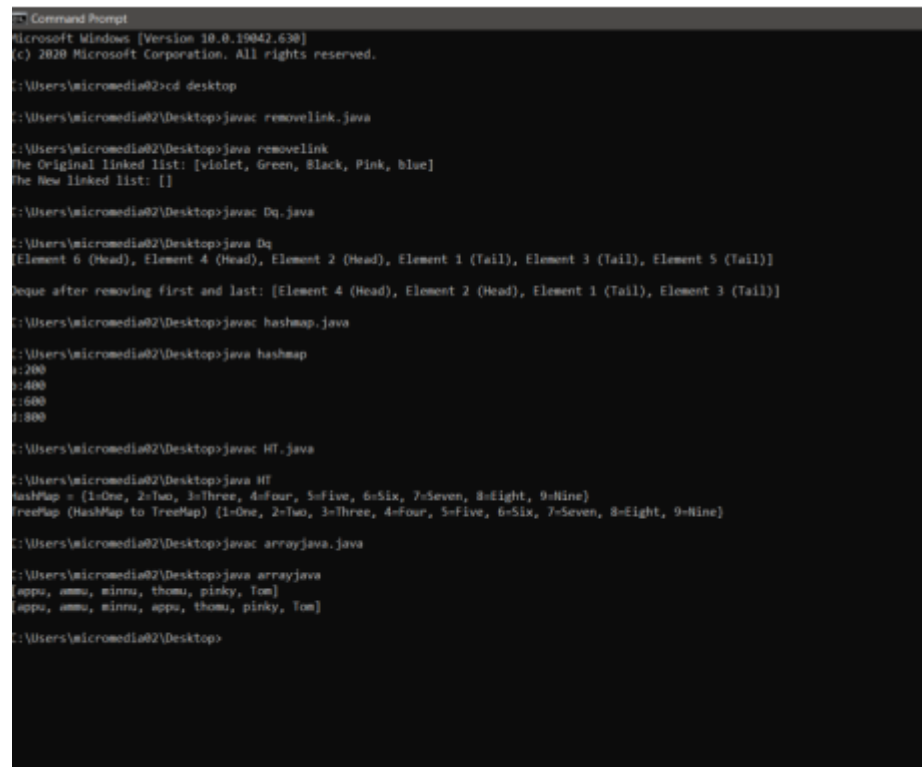
alist.add(3, "appu");

//displaying elements

System.out.println(alist);

```
}  
  
}
```

output



```
Microsoft Windows [Version 10.0.19042.630]  
(c) 2020 Microsoft Corporation. All rights reserved.  
  
C:\Users\micromedia02>cd desktop  
  
C:\Users\micromedia02\Desktop>javac removelink.java  
  
C:\Users\micromedia02\Desktop>java removelink  
The Original linked list: [violet, Green, Black, Pink, blue]  
The New linked list: []  
  
C:\Users\micromedia02\Desktop>javac Dq.java  
  
C:\Users\micromedia02\Desktop>java Dq  
Element 6 (Head), Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail), Element 5 (Tail)]  
Deque after removing first and last: [Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail)]  
  
C:\Users\micromedia02\Desktop>javac hashmap.java  
  
C:\Users\micromedia02\Desktop>java hashmap  
0:200  
0:400  
0:600  
0:800  
  
C:\Users\micromedia02\Desktop>javac HT.java  
  
C:\Users\micromedia02\Desktop>java HT  
HashMap = [1=One, 2=Two, 3=Three, 4=Four, 5=Five, 6=Six, 7=Seven, 8=Eight, 9=Nine]  
TreeMap (HashMap to TreeMap) [1=One, 2=Two, 3=Three, 4=Four, 5=Five, 6=Six, 7=Seven, 8=Eight, 9=Nine]  
  
C:\Users\micromedia02\Desktop>javac arrayjava.java  
  
C:\Users\micromedia02\Desktop>java arrayjava  
apple, ammu, minnu, thomu, pinky, tom]  
apple, ammu, minnu, apple, thomu, pinky, Tom]  
  
C:\Users\micromedia02\Desktop>
```

28.Program to remove all the elements from a linked list

```
import java.util.*;  
  
public class removelink {  
  
    public static void main(String[] args) {  
  
        // create an empty linked list  
        LinkedList<String> l_list = new LinkedList<String>();  
  
        // use add() method to add values in the linked list  
        l_list.add("violet");  
        l_list.add("Green");  
        l_list.add("Black");  
        l_list.add("Pink");  
        l_list.add("blue");  
  
        // print the list
```



```

System.out.println("The Original linked list: " + l_list);

// Removing all the elements from the linked list
l_list.clear();

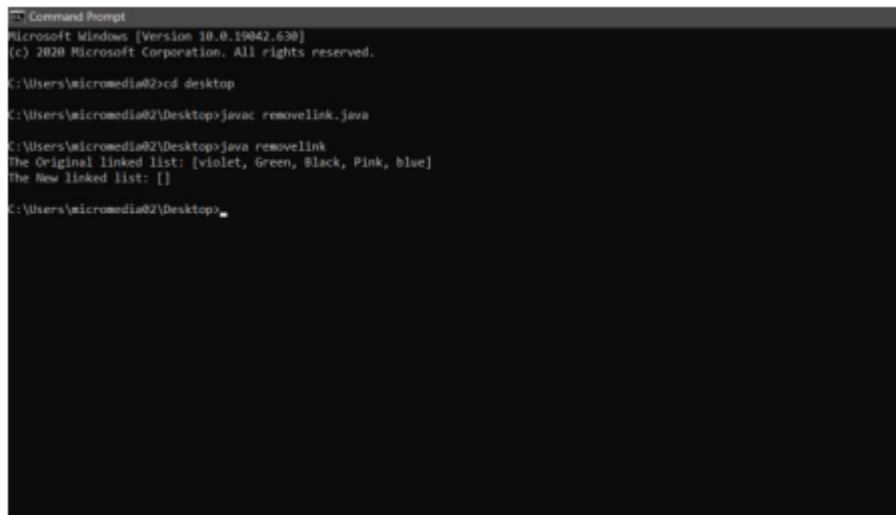
System.out.println("The New linked list: " + l_list);

}

}

```

output



```

C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac removeLink.java
C:\Users\micromedia02\Desktop>java removeLink
The Original linked list: [violet, Green, Black, Pink, blue]
The New linked list: []
C:\Users\micromedia02\Desktop>

```

29.program to demonstrate the addition and deletion of elements in dequeue

```

import java.util.*;

public class DequeExample {

    public static void main(String[] args)

    {

        Deque<String> deque

        = new LinkedList<String>();

        // We can add elements to the queue

        // in various ways

        // Add at the last

        deque.add("Element 1 (Tail)");

        // Add at the first

        deque.addFirst("Element 2 (Head)");

        // Add at the last

```

```

deque.addLast("Element 3 (Tail)");

// Add at the first

deque.push("Element 4 (Head)");

// Add at the last

deque.offer("Element 5 (Tail)");

// Add at the first

deque.offerFirst("Element 6 (Head)");

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

// We can remove the first element

// or the last element.

deque.removeFirst();

deque.removeLast();

System.out.println("Deque after removing "

+ "first and last: "

+ deque);

}

}

```

output



```

C:\Command Prompt
Microsoft Windows [Version 10.0.19042.630]
(c) 2020 Microsoft Corporation. All rights reserved.

C:\Users\micromedia02>cd desktop

C:\Users\micromedia02\Desktop>javac removelink.java

C:\Users\micromedia02\Desktop>java removelink
The Original linked list: [violet, green, black, pink, blue]
The New linked list: []

C:\Users\micromedia02\Desktop>javac Dq.java

C:\Users\micromedia02\Desktop>java Dq
Element 6 (Head), Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail), Element 5 (Tail)
Deque after removing first and last: [Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail)]

C:\Users\micromedia02\Desktop>

```

30.program to demonstrate the working of map interface by adding ,removing,changing

```
import java.util.*;
```

```

class hashmap {

    public static void main(String args[])

    {

        Map<String, Integer> hm

        = new HashMap<String, Integer>();


        hm.put("a", new Integer(200));

        hm.put("b", new Integer(400));

        hm.put("c", new Integer(600));

        hm.put("d", new Integer(800));


        // Traversing through the map

        for (Map.Entry<String, Integer> me : hm.entrySet()) {

            System.out.print(me.getKey() + ":");

            System.out.println(me.getValue());

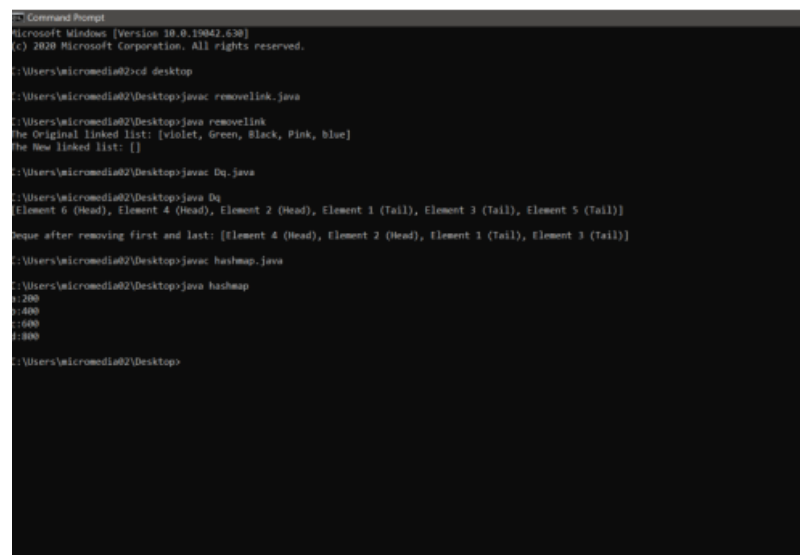
        }

    }

}

```

output



```

C:\Users\micromedia2>cd desktop
C:\Users\micromedia2\Desktop>javac removelink.java
C:\Users\micromedia2\Desktop>java removelink
The Original linked list: [violet, Green, Black, Pink, blue]
The New linked list: []
C:\Users\micromedia2\Desktop>javac Dq.java
C:\Users\micromedia2\Desktop>java Dq
Element 6 (Head), Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail), Element 5 (Tail))
Queue after removing first and last: [Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail)]
C:\Users\micromedia2\Desktop>javac hashmap.java
C:\Users\micromedia2\Desktop>java hashmap
a:200
b:400
c:600
d:800
C:\Users\micromedia2\Desktop>

```

31:program to convert hash map to tree map

```
import java.util.*;

import java.util.stream.*;

public class HT {

    public static void main(String args[]) {

        Map<String, String> map = new HashMap<>();

        map.put("1", "One");
        map.put("2", "Two");
        map.put("3", "Three");
        map.put("4", "Four");
        map.put("5", "Five");
        map.put("6", "Six");
        map.put("7", "Seven");
        map.put("8", "Eight");
        map.put("9", "Nine");

        System.out.println("HashMap = " + map);

        Map<String, String> treeMap = new TreeMap<>();

        treeMap.putAll(map);

        System.out.println("TreeMap (HashMap to TreeMap) " + treeMap);

    }

}
```

output

```
C:\Users\micromedia02>cd desktop
C:\Users\micromedia02\Desktop>javac removellink.java
C:\Users\micromedia02\Desktop>java removellink
The Original linked list: [violet, Green, Black, Pink, blue]
The New linked list: []
C:\Users\micromedia02\Desktop>javac Dq.java
C:\Users\micromedia02\Desktop>java Dq
[Element 6 (Head), Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail), Element 5 (Tail)]
Deque after removing first and last: [Element 4 (Head), Element 2 (Head), Element 1 (Tail), Element 3 (Tail)]
C:\Users\micromedia02\Desktop>javac hashmap.java
C:\Users\micromedia02\Desktop>java hashmap
a:200
b:400
c:600
d:800
C:\Users\micromedia02\Desktop>javac HT.java
C:\Users\micromedia02\Desktop>java HT
HashMap {1=One, 2=Two, 3=Three, 4=Four, 5=Five, 6=Six, 7=Seven, 8=Eight, 9=Nine}
TreeMap (HashMap to TreeMap) {1=One, 2=Two, 3=Three, 4=Four, 5=Five, 6=Six, 7=Seven, 8=Eight, 9=Nine}
C:\Users\micromedia02\Desktop>
```

32:Program to list the sub directories and files in a given directory and also search for a file name

```
import java.io.File;
```

```
import java.util.*;
```

```
import java.io.*;
```

```
public class p1 {
```

```
    public static final String RED="\033[0;31m";
```

```
    public static final String RESET="\033[0m";
```

```
    static void RecursivePrint(File[] arr, int index, int level, String searchfor) {
```

```
        // exit condition
```

```
        if (index == arr.length)
```

```
            return;
```

```
        // space for internal level
```

```
        for (int i = 0; i < level; i++)
```

```
            System.out.print("\t");
```

```
            if(arr[index].getName().toLowerCase().contains(searchfor))
```

```
                System.out.print(RED);
```

```
            else
```

```

System.out.print(RESET);

// for files
if (arr[index].isFile())
System.out.println(arr[index].getName());
else if (arr[index].isDirectory()) {
System.out.println "[" + arr[index].getName() + "]";
RecursivePrint(arr[index].listFiles(), 0, level + 1, searchfor);
}
RecursivePrint(arr, ++index, level, searchfor);
}

public static void main(String[] args) {
Scanner scan = new Scanner(System.in);
System.out.println("Enter the directory path");
String maindirpath = scan.nextLine();
System.out.println("Enter the file/directory name to search");
String searchfor = scan.nextLine();
File maindir = new File(maindirpath);
if (maindir.exists() && maindir.isDirectory()) {
File arr[] = maindir.listFiles();
System.out.println("#####");
System.out.println("Files from main directory" + maindir);
System.out.println("#####");
RecursivePrint(arr, 0, 0, searchfor.toLowerCase()); // array,index
}
}
}

```

Output

```
C:\Users\micromedia02\Desktop>java p1
Enter the directory path
desktop
Enter the file/directory name to search
p1.java
C:\Users\micromedia02\Desktop>
```

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

```
import java.io.FileReader;
import java.io.FileWriter;
import java.io.IOException;
import java.io.*;
import java.util.*;
import java.io.File;

class read {

public static void main(String[] args) {
String var = "";
Scanner scan = new Scanner(System.in);
System.out.println("Enter the text to create file : type exit to stop"
);
while (!var.endsWith("exit\n"))
var = var + scan.nextLine()+"\n";
try {
File file = new File("output.txt");
FileWriter fw = new FileWriter(file);
fw.write(var);
fw.close();
System.out.println("Reading File content");
FileReader fr = new FileReader("output.txt");
String str = "";
int i;
while ((i = fr.read()) != -1) {
// Storing every character in the string
```

```

str += (char) i;
}

System.out.println(str);

fr.close();

} catch (IOException e) {

System.out.println("There are some exception");

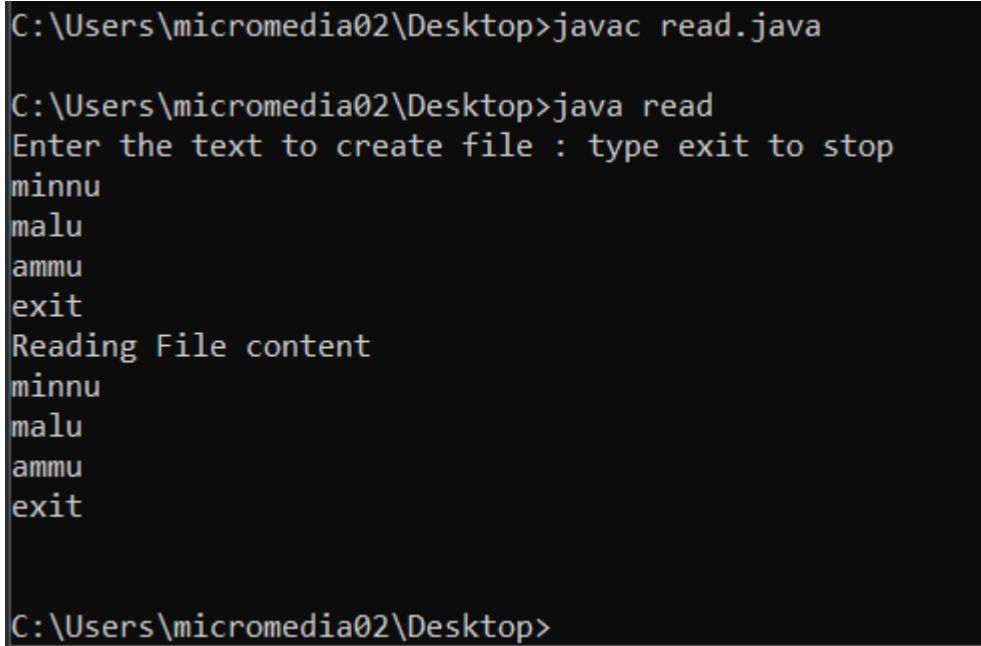
}

}

}

```

Output



```

C:\Users\micromedia02\Desktop>javac read.java

C:\Users\micromedia02\Desktop>java read
Enter the text to create file : type exit to stop
minnu
malu
ammu
exit
Reading File content
minnu
malu
ammu
exit

C:\Users\micromedia02\Desktop>

```

34: Write a program to copy one file to another Pre-requisite Create a text file with content where the java program is running for reading

```

import java.io.FileReader;

import java.io.FileWriter;

import java.io.IOException;

import java.io.*;

import java.util.*;

import java.io.File;

public class copy {

public static void main(String[] args) {

```



```
Scanner scan=new Scanner(System.in);

System.out.println("Enter the source File Name");

String source=scan.nextLine();

try {

FileReader fr=new FileReader(source);

String str = "";

int i;

System.out.println("Reading from file "+source);

while ((i = fr.read()) != -1) {

// Storing every character in the string

str += (char) i;

}

System.out.println(str);

System.out.println("\nEnter the filename to copy");

String destination=scan.nextLine();

File file=new File(destination);

FileWriter fw = new FileWriter(file);

fw.write(str);

fr.close();

fw.close();

System.out.println("Copied from "+source+" to "+destination+ " Successfully..!");

} catch (Exception e) {

//TODO: handle exception

System.out.println("Exception Occured");

}

}

}
```

```

C:\Users\micromedia02\Desktop>javac copy.java

C:\Users\micromedia02\Desktop>java copy
Enter the source File Name
copy_written.txt
Reading from file copy_written.txt
copy file

Enter the filename to copy
copy_to_be_text
Copied from copy_written.txt to copy_to_be_text Successfully..!

C:\Users\micromedia02\Desktop>

```

35: Write a program that reads from a file having integers. Copy even numbers and odd numbers to separate files Pre-requisite Create a text file with content of numbers where the java program is running for reading numbers

```

import java.io.FileReader;

import java.io.FileWriter;

import java.io.IOException;

import java.io.*;

import java.util.*;

import java.io.File;

public class oddeven {

public static void main(String[] args) {

try {

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

BufferedReader br = new BufferedReader(fr);

File file1 = new File("oddnumbers.txt");

FileWriter fw1 = new FileWriter(file1);

File file2 = new File("evennumbers.txt");

FileWriter fw2 = new FileWriter(file2);

String num;

while ((num = br.readLine()) != null) {

if (Integer.parseInt(num) % 2 == 0) {

fw2.write(num + "\n");

} else {

```

```
fw1.write(num + "\n");  
}  
}  
fw1.close();  
fw2.close();  
} catch (Exception e) {  
    // TODO: handle exception  
    System.out.println("Error");  
}  
}  
}
```

```
1 To copy a file
```



```
1
```



36.Client server communication using Socket – TCP/IP

Program

server

```
import java.io.*;
import java.net.*;

public class Myserver {

    public static void main(String[] args) {

        try{

            ServerSocket ss=new ServerSocket(6666);

            Socket s=ss.accept(); //establishes connection

            DataInputStream dis=new DataInputStream(s.getInputStream());

            String str=(String)dis.readUTF();

            System.out.println("message= "+str);

            ss.close();

        }catch(Exception e) { System.out.println(e);}

    }

}
```

Client

```
import java.io.*;
import java.net.*;

public class Myclient {

    public static void main(String[] args) {

        try{

            Socket s=new Socket("localhost",6666);

            DataOutputStream dout=new DataOutputStream(s.getOutputStream());

            dout.writeUTF("Hello Server"); // Writes a string to the underlying output stream using modified
            UTF-8 encoding

            dout.flush();

            dout.close();

            s.close();

        }catch(Exception e){System.out.println(e);}
```

```
}  
}
```

OUTPUT

```
C:\Users\micromedia02\Desktop>javac Myserver.java  
  
C:\Users\micromedia02\Desktop>java Myserver  
message= Hello Server  
  
C:\Users\micromedia02\Desktop>
```

```
C:\Users\micromedia02\Desktop>javac Myclient.java  
  
C:\Users\micromedia02\Desktop>java Myclient  
  
C:\Users\micromedia02\Desktop>
```