RECORD

Object Oriented Programming Lab [20MCA132]

Submitted By

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1st Year MCA Batch A

Roll No: 20

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);

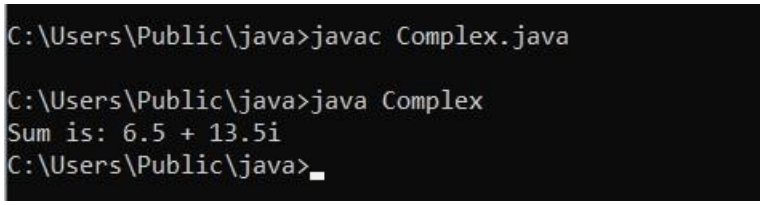
Complex temp = sum(c1, c2);

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

}

}

Output



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

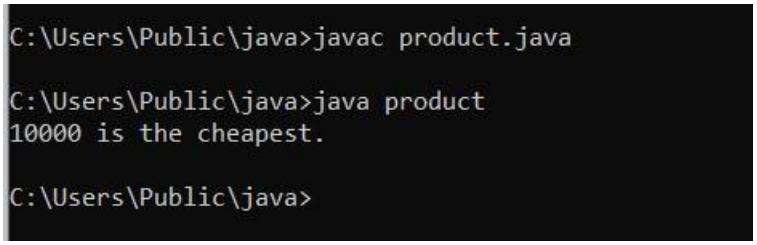
public class product {

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.");
}
}
```

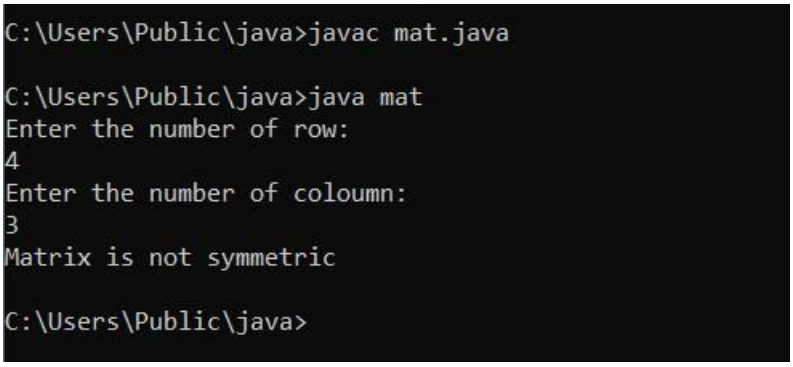
Output



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:



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.Processori_processor = intel.newProcessor(7, "intel"); Cpu.Rami_ram
= new Ram(1030, "hp");
intel.display();
i_processor.display();
i_ram.display();
}
}
```

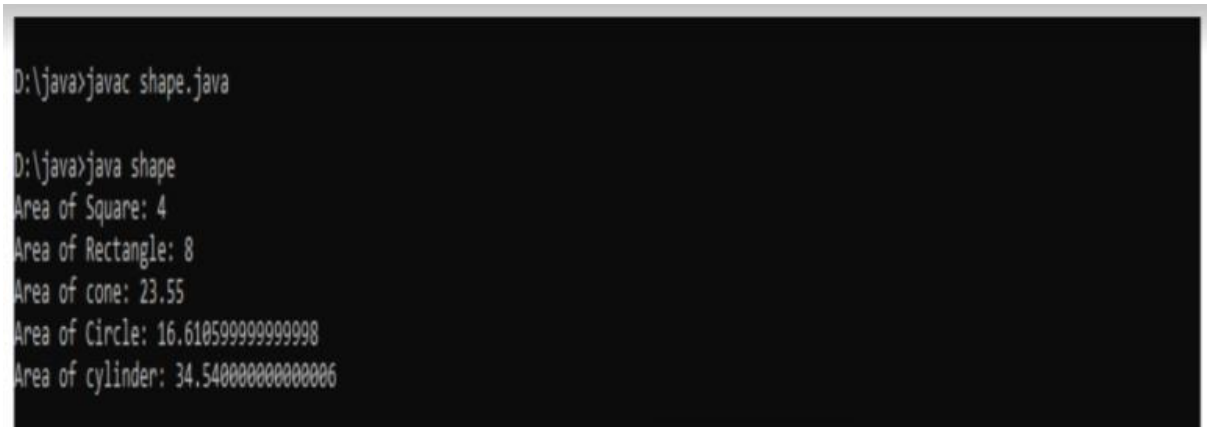
Output

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)
{
ShapeAobj=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:



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 member 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");

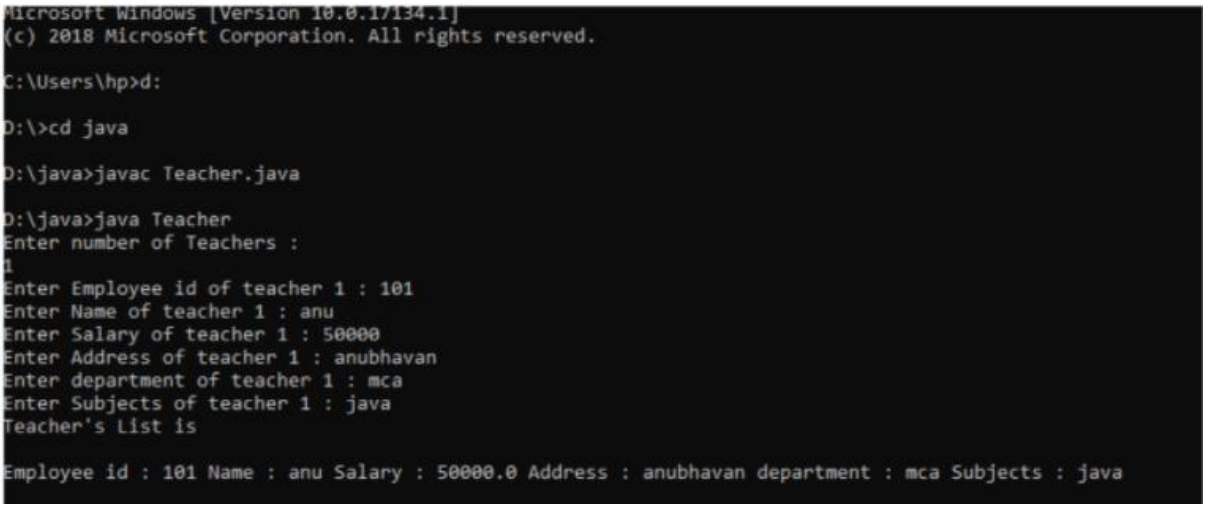
for(int i=0;i<n;i++) { obj[i].display();

}

}

}

Output:



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:

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);

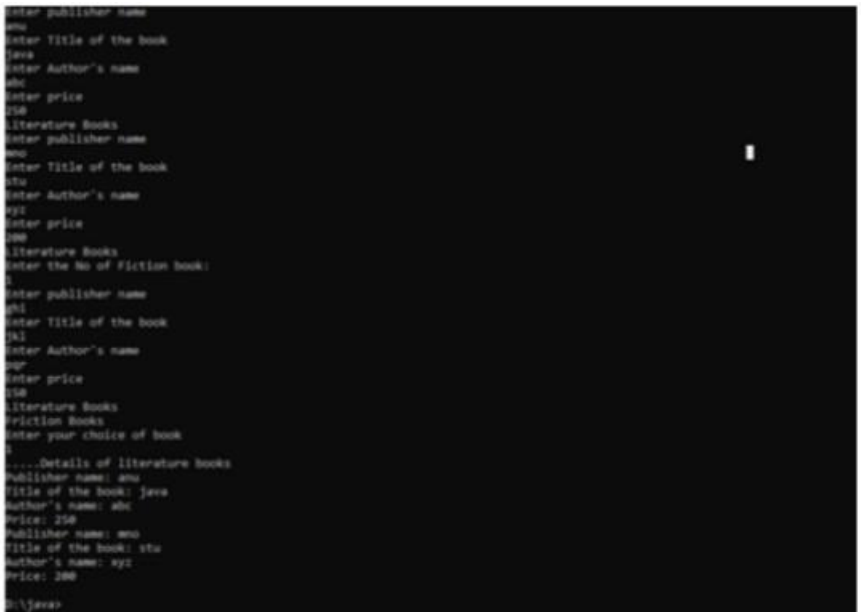
System.out.println("Enter publisher name");

```
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

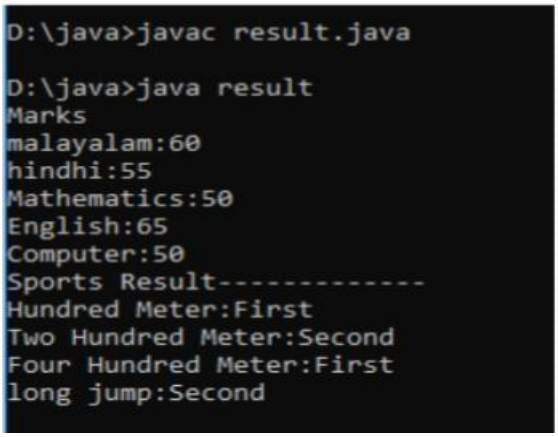


9. Create classes Student and sports.Create another class result inherited from student and sports.Display the academic and sports score of a student.

```
interface student
{ void
stresullt();

} 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 hunderedmerter:"+ eighthundred);
System.out.println("Two Hundred Meter:"+twohundred);
System.out.println("long jump:"+longjump);
System.out.println("Relay:"+relay);
} public void
stresullt()
{
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.stresullt(); r.spresult();
}
}
```

Output



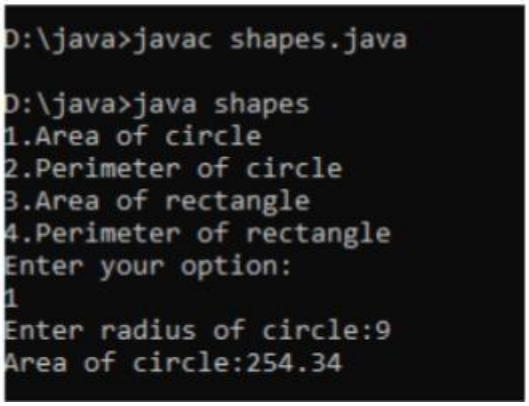
10. Create an interface having prototype of functions area() and perimeter().Create two classes circle and rectangle which implements the above interface.Create a menu driven program to find area and perimeter of objects.

```
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:



11. **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);


}
}
```

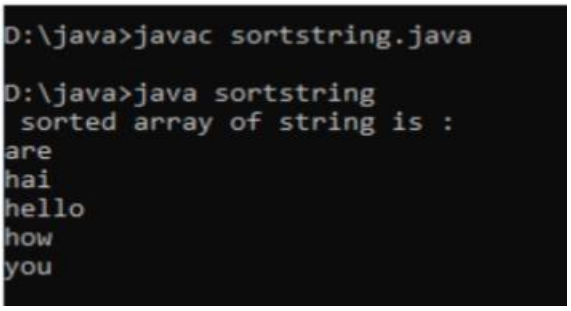
Output:

12. 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



13. 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

```
D:\java>javac search.java

D:\java>java search
enter the number of elements for the array :
5
enter the elements of the array :
8
6
1
3
5
enter the element want to search :
5
element found at position :5
```

14.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

```
D:\java>javac Sample_String.java

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

15. **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]

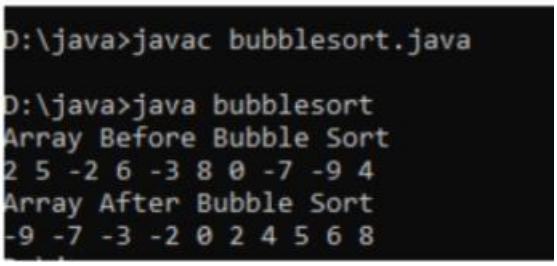
The element 9 is found at position 2 in stack

16. **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(n2) 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



17. **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());
System.out.println("Contents of al: " + al);

al.remove("F");
al.remove(2);

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

Output

```
D:\java>java ArrayListDemo
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]
```

18. 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();
```

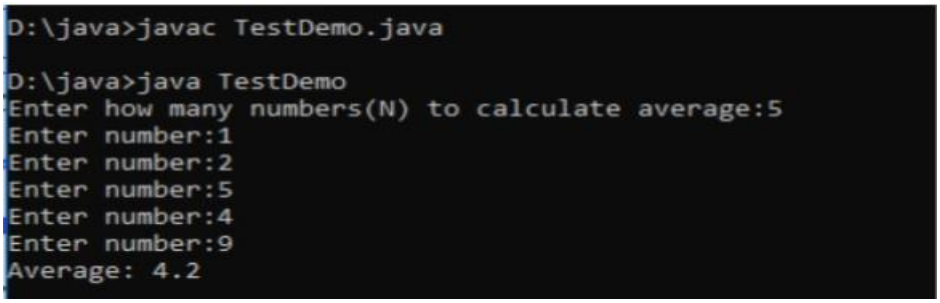
```
System.out.print("Enter password :: ");

password = s.nextLine();

int length = username.length();

try { if(length
< 6) throw
new
UsernameEx
ception("Use
rname 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

19. 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 bea number. Try again");
}
}
}
System.out.println("Average: "+ total / N);
}
}
```

Output



20. 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++;
}
}
```

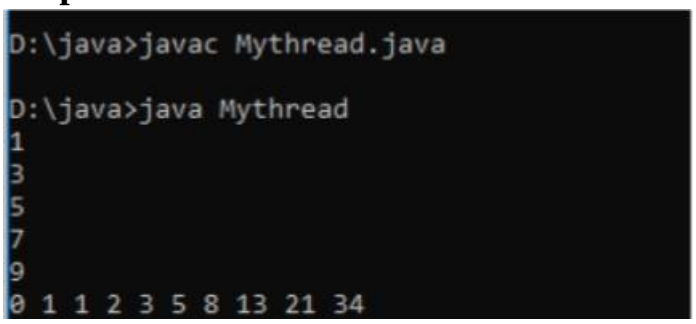
```
System.out.println("Exiting from Thread B ...");
} }
public class Demonstration_111 { public
static void main(String args[]) {
ThreadA a = new ThreadA();

ThreadB b = new ThreadB();
a.start();
b.start();
System.out.println("... Multithreading is over ");
}
}
```

21. Define 2 classes one for generating fibanocci numbers and other for displaying even numers 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);
```

```
for(i=2;i<count;++i)
{
n3=n1+n2;
System.out.print(" "+n3);
n1=n2; n2=n3;
} }
}
```

Output:

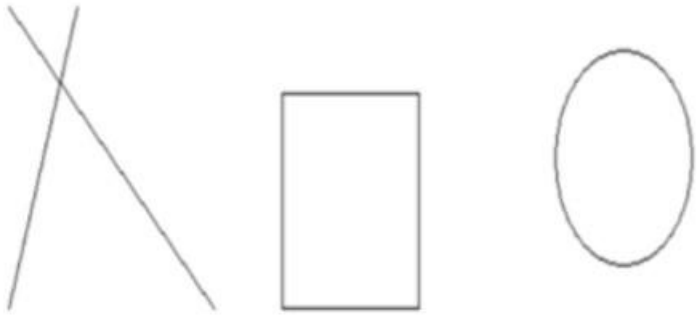


22. Program to draw circle,rectangle,line in applet

```
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);
} }
.ht
ml
co
de
<html>
<head>
</head>
<body>
```

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

Output



23. Program to find maximum of three numbers using AWT

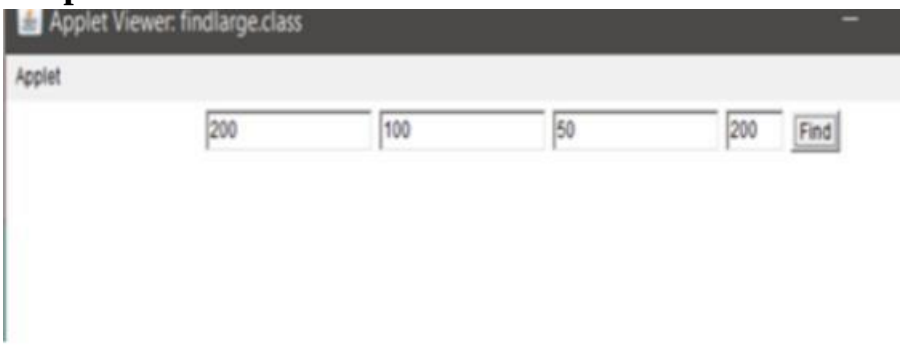
```
import java.awt.*; import java.awt.Event; import java.applet.*;
public class largest extends Applet
{
TextField Txt1,Txt2,Txt3;
public void init(){ Txt1 =
new TextField(10);
Txt2 = new TextField(10);
Txt3 = new TextField(10);

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 booleanaction(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



24. 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.*;

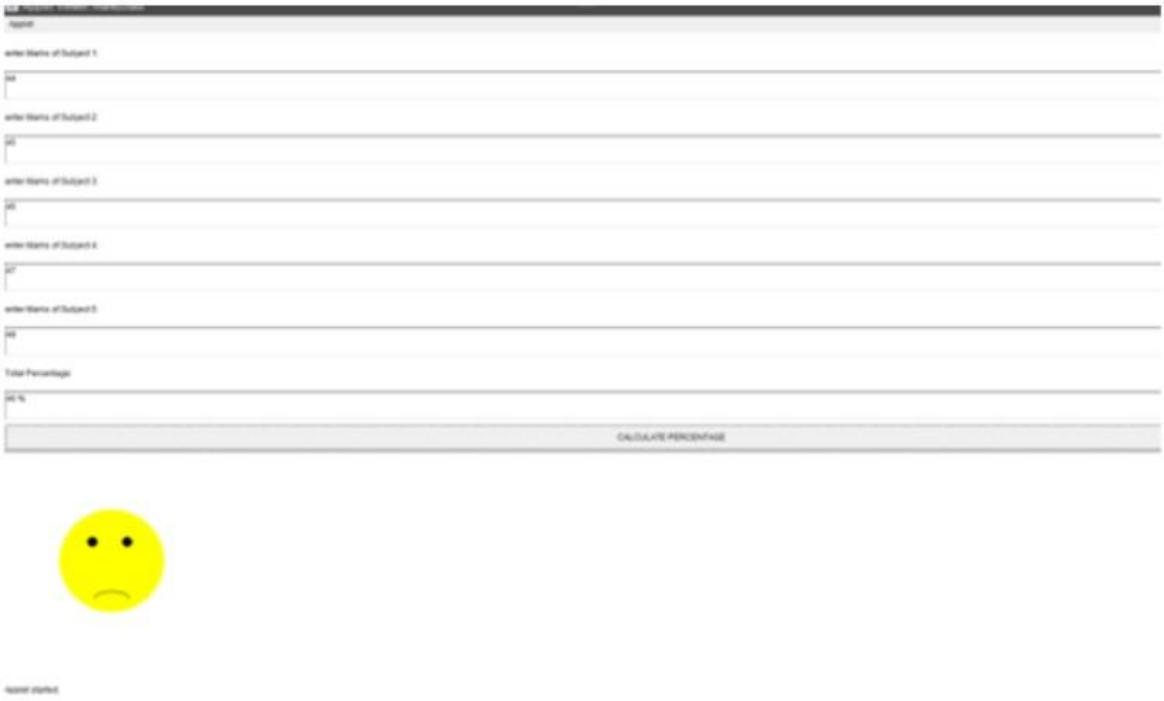
```
public class marks extends Applet implements ActionListener { public
int per =0;
Label l1 = new Label("enter Marks of Subject 1: ");
Label l2 = new Label("enter Marks of Subject 2: ");

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) {
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



25. 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 ColordoorColor = 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

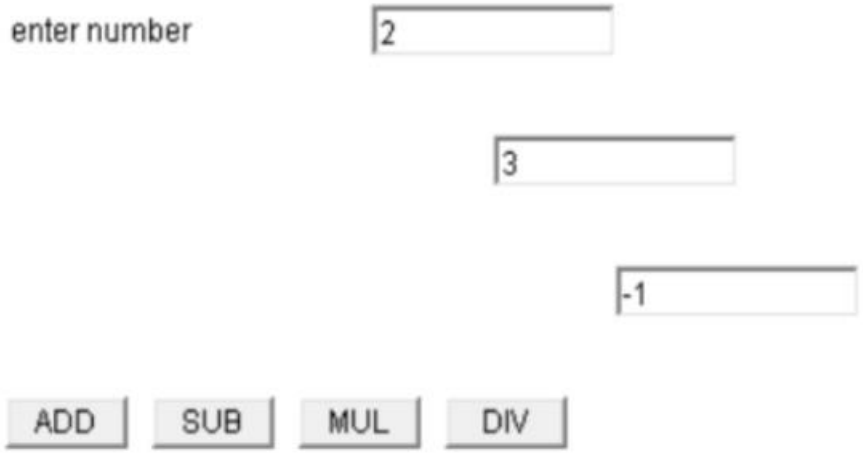
26. Implement a simple calculator using AWT components import java.awt.*; import java.awt.event.*; import java.applet.*;

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

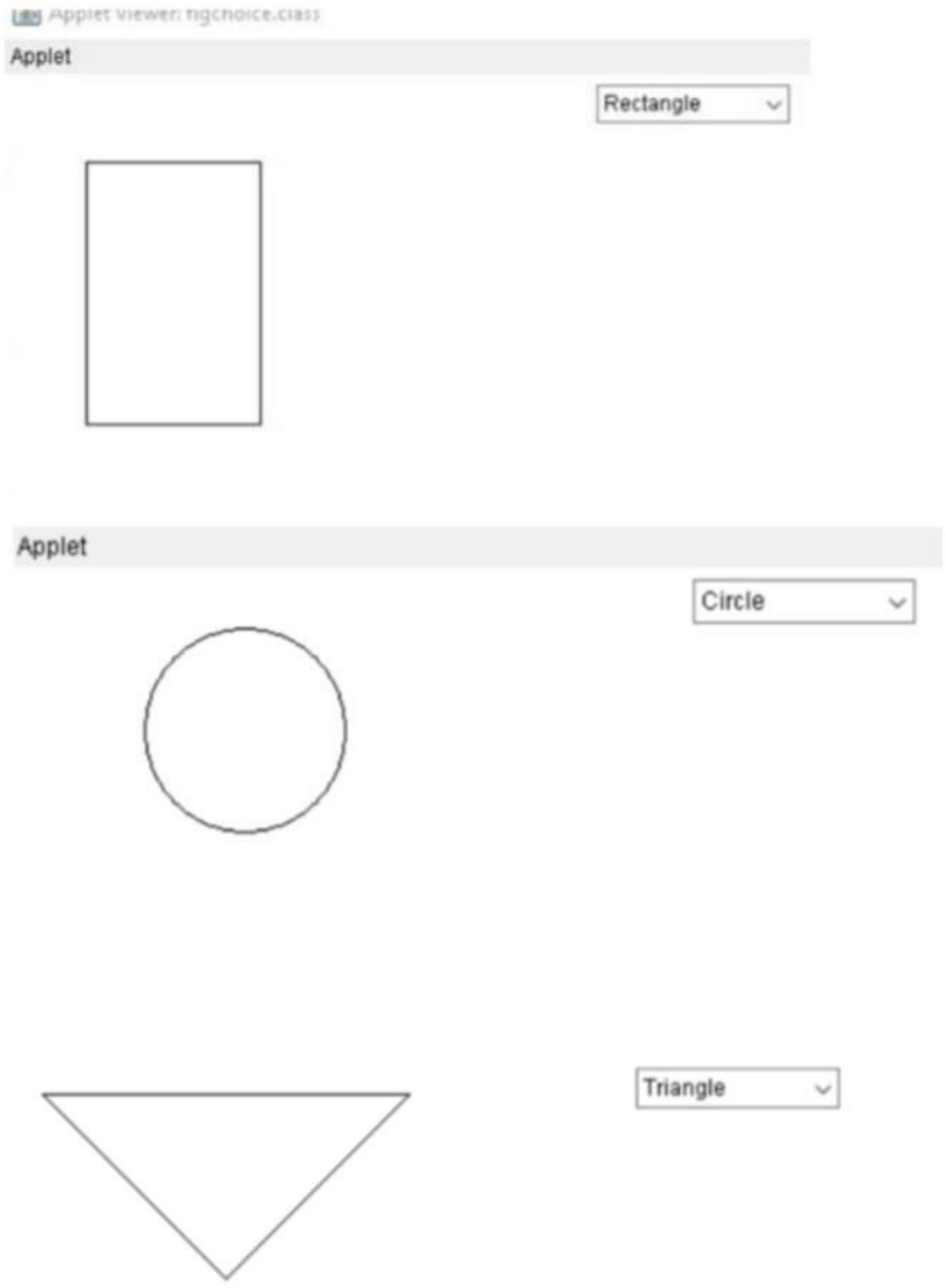


27. **Develop a program that has a choice component which contains the names of shapes such as rectangle ,triangle.square and circle,Draw the corresponding shapes for given parameters as per user's choice.**

```
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

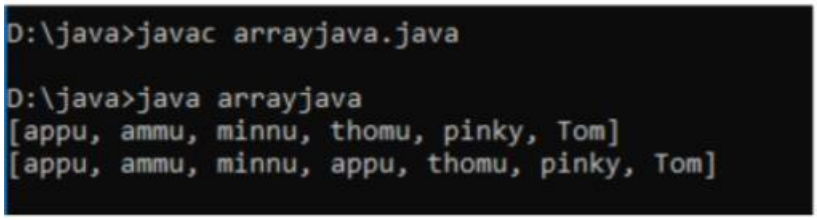


28. Maintain a list of Strings using ArrayList from collection framework, perform built-in

```
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");

System.out.println(alist);

alist.add(3, "appu");

System.out.println(alist);
} }
```

Output



29. 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);
} }
```

```
D:\java>javac removelink.java

D:\java>java removelink
The Original linked list: [violet, Green, Black, Pink, blue]
The New linked list: []
```

30. 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

```
D:\java>java DequeExample
[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)]
```

31. 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

```
D:\java>javac hashmap.java

D:\java>java hashmap
a:200
b:400
c:600
d:800
```

32. 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);
}
}
```

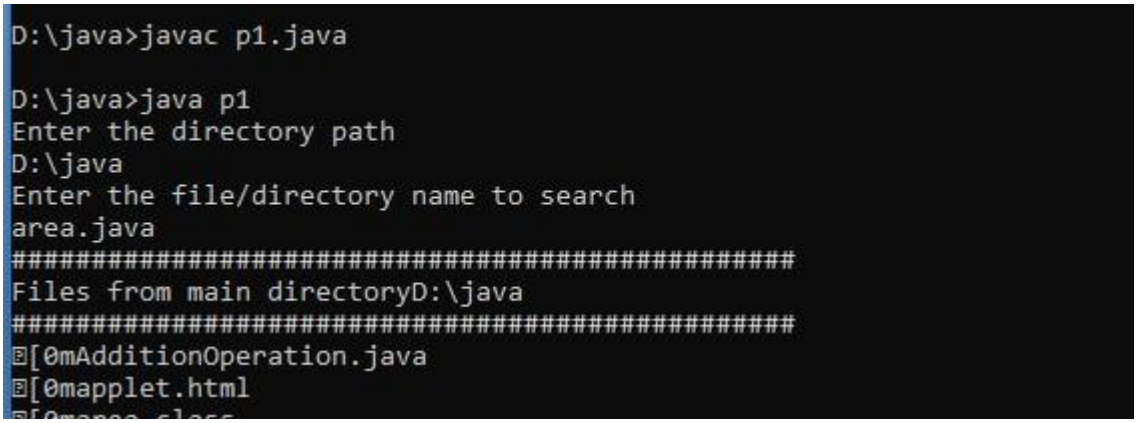
Output

33. 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 internbal level
 for (int i = 0; i < level; i++)
 System.out.print("\t");


 if(arr[index].getName().toLowerCase().contains(se
 archfor))   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:

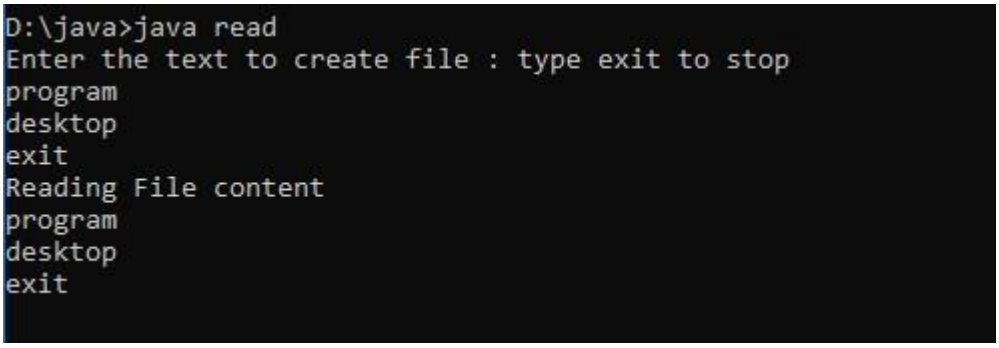


33:Write a program to write to a file ,then read from the file and display the contents on the console import java.io.FileReader; import java.io.FileWriter; import java.io.IOException; import java.io.*; import java.util.*; import java.io.File; class read {

```
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:



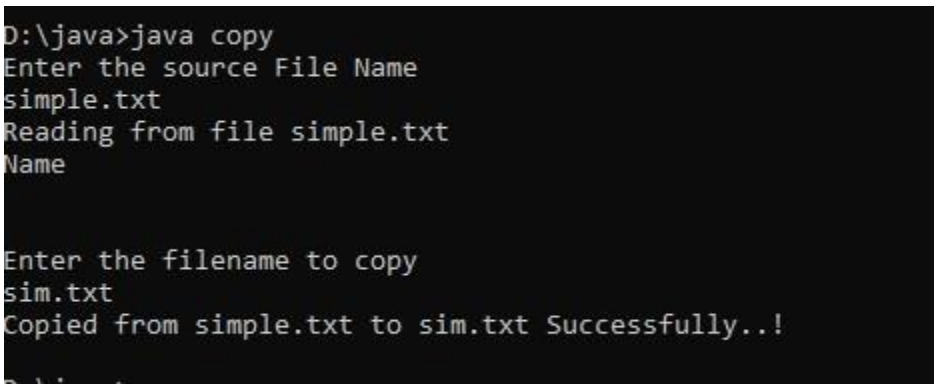
34: Write a program to copy one file to another

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");
 }
 }
}
```



35: Write a program that reads from a file having integers. Copy even numbers and odd numbers to separate files

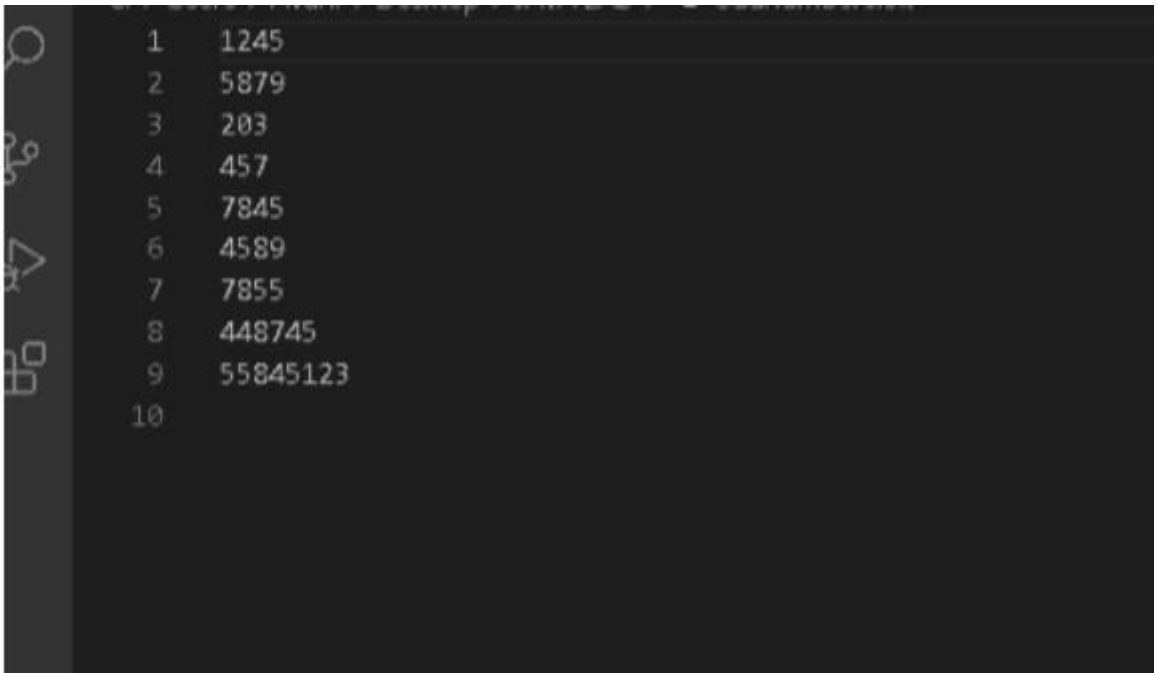
Pre-requisite

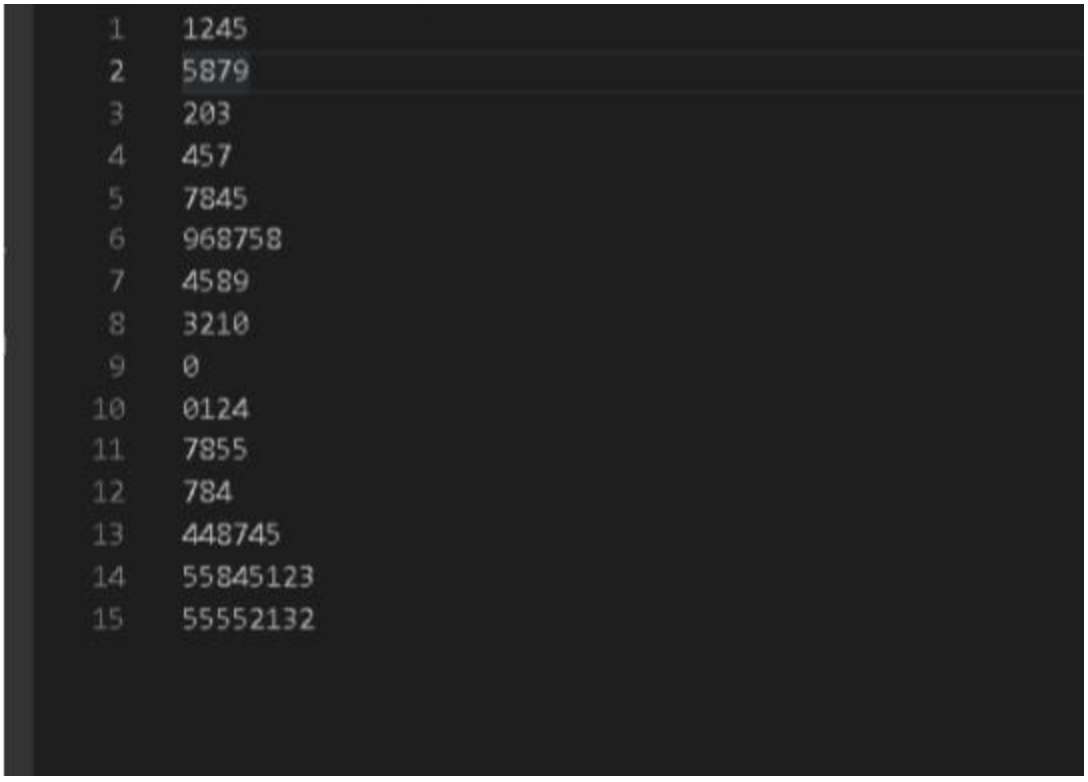
Create a text file with content of numbers where the java program is running for reading numbers

```
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");
 }
 }
}
```

Output:

```
D:\java>javac oddeven.java

D:\java>java oddeven
```





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);}
}
}
```

Output: