PRACTICALS

IT11L

Practical Assignment Book

MCA I

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PART I

JAVA PROGRAMMING

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1. Installation of JDK environment & following utilities. What is javac , javap and javadoc?

Ans:

To Install the JDK Software and Set JAVA_HOME on a Windows System.

procedure:

INSTALLATION OF JDK ENVIORNMENT:

1. To install the JDK software, do the following:Go to https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.exe
    1. Select the appropriate JDK software and click Download.
       The JDK software is installed on your computer in the default location; for example, at C:\Program Files\Java\jdk18.2.0_02. You can move the JDK software to another location.
2. To set JAVA_HOME, do the following:
    1. Right click My Computer and select Properties.
    2. On the Advanced tab, select Environment Variables, and then edit JAVA_HOME to point to where the JDK software is located, for example, C:\Program Files\Java\jdk18.2.0_02.

WHAT IS JAVAC, JAVAP AND JAVADOC??

Ans:

javac:

javac is a command or tool which is used to compile a java file. It is also known as java compiler(javac). It physically exists in the system at the java installed folder.

In my system its location is: C:\Program Files\Java\jdk1.6.0_21\bin
Under this bin folder you can see as javac.exe that is javac compiler.
To compile any java file, we use it as: javac (java file name).java

Javap:

javap is also a command or tool(important).It is used to see the structure of any predefined or user defined class.(means to see how many methods, variables, constants, constructor etc. in a class)It physically exists in the system at the java installed folder.

In my system its location is : C:\Program Files\Java\jdk1.6.0_21\bin

Under this bin folder you can see javap.exe, which is a javap tool.

Javadoc:

javadoc is also a command or tool which is used to create API documents of user defined class. It is java documentation command. In the java file, we must use the documentation comment /**..... */ to post information for the class, method, constructor, fields etc. It physically exists in the system at the java installed folder.

In my system its location is: C:\Program Files\Java\jdk1.6.0_21\bin
Under this bin folder you can see as javadoc.exe that is the Java API documentation command.

2. Design an application using Array.

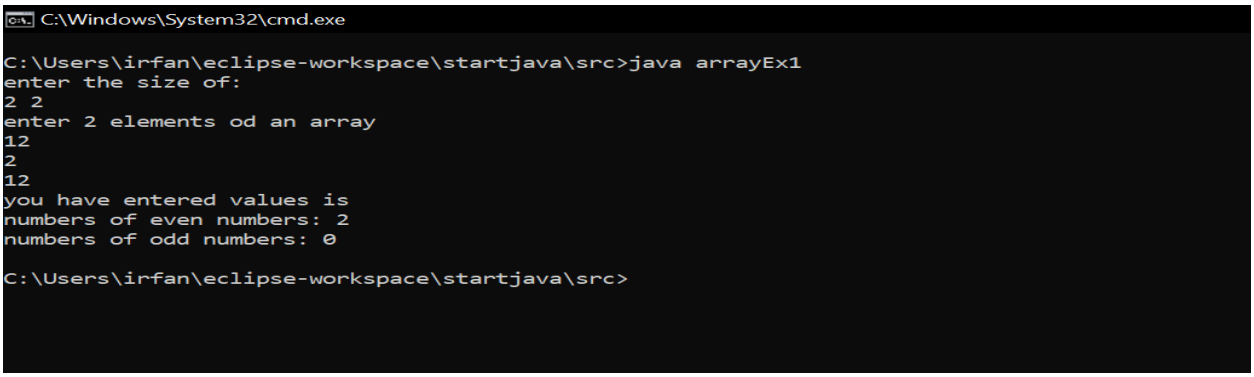
1. Count the number of Even and Odd elements in 1D array / 2D array.

1D array:

```
import java.util.*;
public class arrayEx1 {
     public static void main (String [] args) {
    int len;
    Scanner s = new Scanner(System.in);
    System.out.println("enter the size of: ");
    len = s.nextInt();
    int a[] = new int[len];
    System.out.println("enter "+len+" elements od an array");
    for(int i=0; i<len;i++) {

        a[i]= s.nextInt();
    }
    int count = 0;
    int b =0;
    for(int i=0;i<len;i++) {

    if(a[i]%2==0) {
                        count++;
                        System.out.println(a[i];
    }
    else
    {     b++;
    System.out.println(a[i]);
    }
    }
```

```
    System.out.println("you have entered values is");
       System.out.println("numbers of even numbers: "+count);
    System.out.println("numbers of odd numbers: "+b);

     }
}
```

Output:

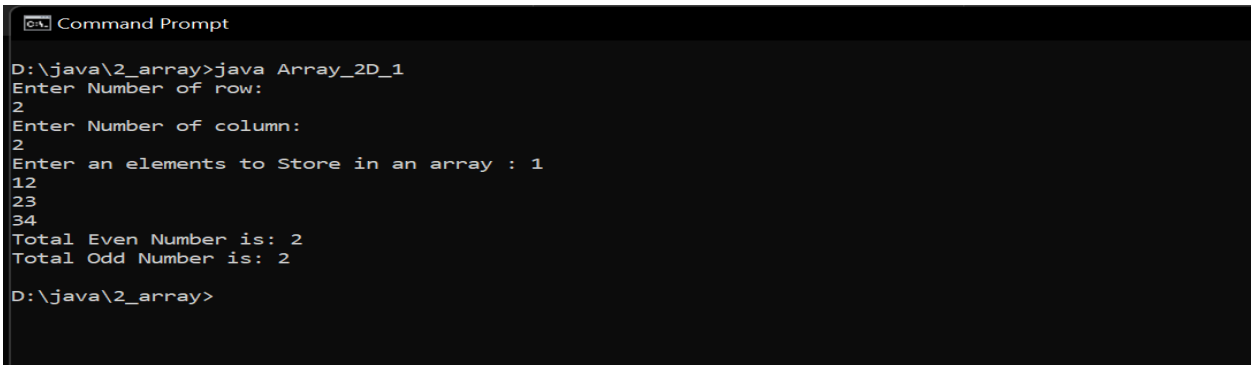


2D array:

```
import java.util. Scanner;
public class Array_2D_1 {
  public static void main(String args[]) {
   int even=0,odd=0;
   Scanner sc=new Scanner(System.in);
   System.out.println("Enter Number of row: ");
   int R=sc.nextInt();
   System.out.println("Enter Number of column: ");
   int C=sc.nextInt();
   int a[][]=new int[R][C];
   System.out.print("Enter an elements to Store in an array : ");
      for (int i=0; i<R;i++){
         for(int j=0;j<C;j++){
            a[i][j]=sc.nextInt();
         }
      }
```

```
        for (int i=0; i<R;i++) {
            for(int j=0;j<C;j++) {
                if(a[i][j]%2==0) {
                    even++;
                }
                else{
                    odd++;
                }
            }
        }
        System.out.println("Total Even Number is: "+even);
        System.out.println("Total Odd Number is: "+odd);
        sc.close();
    }
}
```

Output:



2. Count the number of negative and positive elements in 1D array/ 2D array.

1D array

```
import java.util.*;

public class arrayEx2 {

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

```
    int n
        Scanner sc = new Scanner(System.in);
    System.out.println("enter the size of array");
  n= sc.nextInt();
  int arr[]=new int[n];
System.out.println("enter the elements of array");
   for(int i=0;i<n;i++) {
      arr[i] = sc.nextInt();
      }
   int b=0;
   int a=0;
   for(int i=0;i<n;i++) {
      System.out.println("values: "+arr[i]);
      if(arr[i]>0) {
         a++;
      }else{
         b++;
         }
 }
   System.out.println("the number of positive elements in an array"+a);
   System.out.println(" ");
   System.out.println("the number of positive elements in an array"+b);
```

```
    }
}
```

Output:

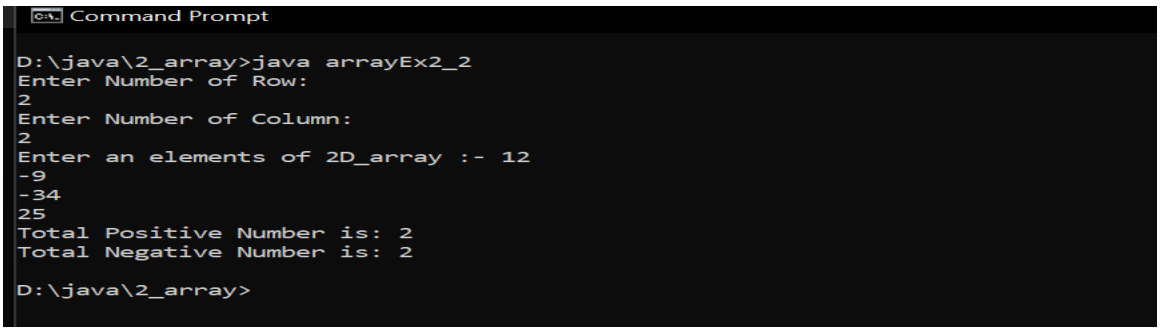
```
PS D:\> cd java
enter the elements of array
12
-89
-45
0
values: 12
values: -89
values: -45
values: 0
the number of positive elements in an array1

the number of positive elements in an array3
PS D:\java\2_array>
```

2D Array:

```
import java.util.Scanner;
public class arrayEx2_2 {
   public static void main(String args[]) {
    int Negative=0,Positive=0;
    Scanner sc=new Scanner(System.in);
    System.out.println("Enter Number of Row: ");
    int R=sc.nextInt();
    System.out.println("Enter Number of Column: ");
    int C=sc.nextInt();
    int a[][]=new int[R][C];
    System.out.print("Enter an elements of 2D_array :- ");
        for (int i=0; i<R;i++){
            for(int j=0;j<C;j++){
```

```
            a[i][j]=sc.nextInt();
        }
    }
    for (int i=0; i<R;i++){
        for(int j=0;j<C;j++){
            if(a[i][j]>=0){
                Positive++;
            }
            else{
                Negative++;
            }
        }
    }
    System.out.println("Total Positive Number is: "+Positive);
    System.out.println("Total Negative Number is: "+Negative);
  }
}
```

Output:-



3.Find the square of each element of 1D array / 2D array

1D array:

```
import java.util. Scanner;
public class arrayEx3_1{
   public static void main(String[] args) {
      int size;
      int Temp=0;
      Scanner sc=new Scanner(System.in);
      System.out.print(" Enter Number of elements in an array: ");
      size=sc.nextInt();
      int a[]=new int[size];
      System.out.print(" Enter  elements for an array: ");
      for (int i=0;i<size;i++) {
         a[i]=sc.nextInt();
      }
      for(int i=0;i<size;i++) {
         Temp=a[i]*a[i];
         System.out.println("Square of "+a[i]+" is= "+Temp);
      }
   }
}
```

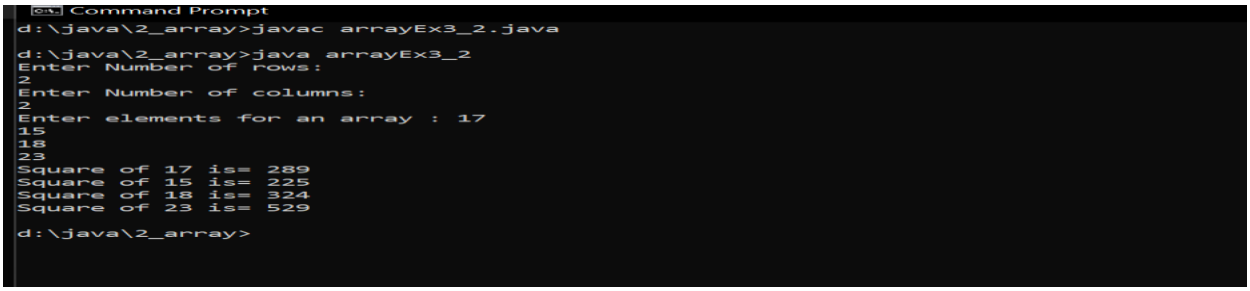
Output:

```
d:\java\2_array>javac arrayEx3_1.java

d:\java\2_array>java arrayEx3_1
 Enter Number of elements in an array: 3
Enter elements for an array: 4
8
9
Square of: 4 is= 16
Square of: 8 is= 64
Square of: 9 is= 81

d:\java\2_array>
```

2D array:

```
import java.util.Scanner;
public class arrayEx3_2 {
   public static void main(String args[]) {
   int Temp=0;
   Scanner sc=new Scanner (System.in);
   System.out.println("Enter Number of rows: ");
   int R=sc.nextInt();
   System.out.println("Enter Number of columns: ");
   int C=sc.nextInt();
   int a[][]=new int[R][C];
   System.out.print("Enter  elements  for an array : ");
      for (int i=0; i<R;i++){
         for(int j=0;j<C;j++){
            a[i][j]=sc.nextInt();
         }
      }
      for (int i=0; i<R;i++){
         for(int j=0;j<C;j++){
            Temp=a[i][j]*a[i][j];
         System.out.println("Square of "+a[i][j]+" is= "+Temp);
         }
      }
     }
}
```

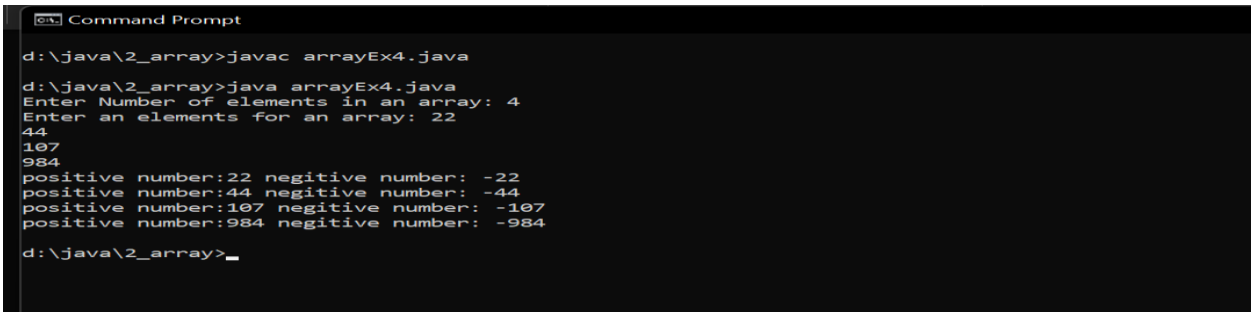
Output:



4.Replace the value 0 with -1 in 1D array.

```
import java.util.Scanner;
public class arrayEx4 {
   public static void main(String[] args) {
      int size;
      Scanner sc=new Scanner(System.in);
      System.out.print("Enter Number of elements in an array: ");
      size=sc.nextInt();
      int a[]=new int[size];
      System.out.print("Enter an elements for an array: ");
      for (int i=0;i<size;i++){
         a[i]=sc.nextInt();
      }
      for(int i=0;i<size;i++){

         System.out.println("positive number:"+a[i]+" negitive number: -"+a[i]);
      }
   }
}
```

Output:



5. Sum of each row in 2D array

```
import java.util.Scanner;
public class arrayEx5{
    public static void main(String args[]) {
    Scanner sc=new Scanner(System.in);
    System.out.print("Enter Number of rows: ");
    int R=sc.nextInt();
    System.out.print("Enter Number of columns: ");
    int C=sc.nextInt();
    int a[][]=new int[R][C];
    System.out.print("Enter Elements for an array : ");
        for (int i=0; i<R;i++){
            for(int j=0;j<C;j++){
                a[i][j]=sc.nextInt(); }
        }
        for(int i=0;i<R;i++){
            int temp=0;
            for(int j=0;j<C;j++){
                System.out.print(" "+a[i][j]);
                temp=temp+a[i][j];  }
            System.out.println(" = "+temp);
        }
    }
}
```

Output:

```
Command Prompt
d:\java\2_array>javac arrayEx5.java

d:\java\2_array>java arrayEx5
Enter Number of rows: 3
Enter Number of columns: 3
Enter Elements for an array : 1
2
3
4
5
6
7
9
12
 1 2 3 = 6
 4 5 6 = 15
 7 9 12 = 28

d:\java\2_array>
```

6. Sum of columns in 2D array.

```
import java.util.Scanner;
public class arrayEx6
{
    public static void main(String args[])
   {
    int temp;
    Scanner sc=new Scanner(System.in);
    System.out.print("Enter Number of rows: ");
    int R=sc.nextInt();
    System.out.print("Enter Number of columns: ");
    int C=sc.nextInt();
    int a[][]=new int[R][C];
    System.out.print("Enter elements for an array : ");
        for (int i=0; i<R;i++){
            for(int j=0;j<C;j++){
                a[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<R;i++){
            temp=0;
```

```
            for(int j=0;j<C;j++){
                System.out.print(" "+a[i][j]);
                temp=temp+a[i][j];
            }
            System.out.println(" ");
        }
        for(int i=0;i<C;i++) {
            temp=0;
            for(int j=0;j<R;j++) {
                temp=temp+a[j][i];
            }
            System.out.println("Sum Of "+(i+1)+" column is:  "+temp);
        }
    }
}
```

Output:

```
d:\java\2_array>java arrayEx6
Enter Number of rows: 2
Enter Number of columns: 3
Enter elements for an array : 90
89
98
80
30
40
 90 89 98
 80 30 40
Sum Of 1 column is:  170
Sum Of 2 column is:  119
Sum Of 3 column is:  138

d:\java\2_array>
```

7. Sum of Upper Right Triangle, Upper Left Triangle, Lower Right Triangle, Lower Left Triangle of elements in 2D array.

Sum of Upper Right and Left Triangle:

```
class array_7{
   /*function to calculate sum*/
   static void sum(int mat[][], int r, int c) {
      int i, j;
      int upperright_sum = 0;
      int upper left sum = 0;
     /*calculate sum of upper right triangle*/
      for (i = 0; i < c; i++)
         for (j = 0; j < r; j++) {
            if (i >= j) {
               upperright_sum += mat[i][j];
            }
         }
      System.out.println("Upperright sum is " + upperright_sum);

     /*calculate sum of upperleft triangle*/
      for (i = 0; i < r; i++)
         for (j = 0; j < c; j++) {
            if (i <= j) {
               upperleft_sum += mat[i][j];
            }
         }
      System.out.println("Upperleft sum is " + upperleft_sum);
   }
   public static void main (String[] args) {
      int r = 3;
      int c = 2;
      int mat[][] = {{ 3, 2 },
                     { 12, 45 },
```

```
                { 7, 17 }};

        sum(mat, r, c);
    }
}
```

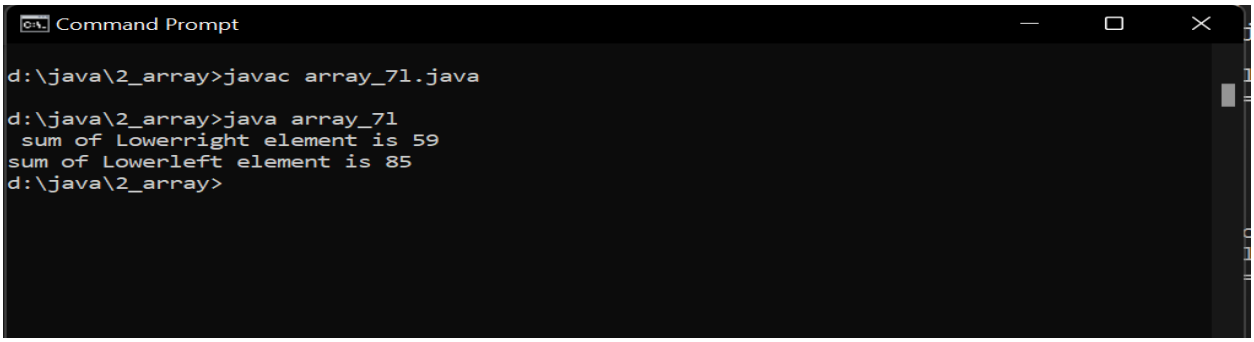
Output:

Sum of lower Right and Left Triangle:

```
class array_7l{
    /*function to calculate sum*/
    static void sum(int mat[][], int r, int c) {
        int i, j, lowerright_sum = 0, lowerleft_sum = 0;
        /*calculate sum of lowerright triangle*/
        for (i = 0; i < c; i++)
            for (j = 0; j < r; j++) {
                if (i <= j) {
                    lowerright_sum += mat[i][j];
                }
            }
        System.out.println(" sum of Lowerright element is " + lowerright_sum);
        /*calculate sum of lowerleft triangle*/
        for (i = 0; i < c; i++)
            for (j = 0; j < r; j++) {
                if (j <= i) {
                    lowerleft_sum += mat[i][j];
                }
            }
```

```
        System.out.print("sum of Lowerleft element is " + lowerleft_sum);
    }
    public static void main (String[] args) {
        int c = 3;
        int r = 3;
        int mat[][] = {{ 7, 5, 8 },
                       { 11, 12, 13 },
                       { 16, 25, 14 }};
        sum(mat, c, r);
    }
}
```

Output:



3. Implementation of Packages, Interface and Abstract class.

1. Write a package for Games, which have two classes Indoor and Outdoor. Use a function display () to generate the list of players for the specific games. Use parameterized constructors.

Indoor class

```
package Games;
public class Indoor {
   protected String player;
   public Indoor() { }
   public Indoor(String p) {
   player = p;  }
   public void display() {
   System.out.println(player);
   }
}
```

Outdoor class:

```
package Games;
public class Outdoor {
   protected String player;
public Outdoor() { }
public Outdoor(String p) {
player = p;  }
public void display() {
System.out.println(player);
}
}
```

Test class implemented above package:

```
public class Test
 {
            public static void main(String args[]{
            Games.Indoor In[] = new Games.Indoor[4];
            In[0] = new Games.Indoor("Arjun");
            In[1] = new Games.Indoor("bholu");
            In[2] = new Games.Indoor("adi");
            In[3] = new Games.Indoor("David");
            System.out.println("/n======================");
            System.out.println("Indoor Players...");
            for(int i=0;i<In.length;i++){
             In[i].display();
            }
             System.out.println("/n=======================");
             System.out.println("Outdoor Players...");
          Games.Outdoor Out[] = new Games.Outdoor[4];
            Out[0] = new Games.Outdoor("fayyaz");
            Out[1] = new Games.Outdoor("musa");
            Out[2] = new Games.Outdoor("nabil");
            Out[3] = new Games.Outdoor("Huzaif");
            for(int i=0;i<Out.length;i++){
             Out[i].display();}
      }
}
```

Output:

2.Create a package MCA which will have 2 classes as class Mathematics with methods to add two numbers , add three float numbers and class Maximum with a method to find maximum of three numbers.

Class Maths_2

```
package MCA;
public class Maths_2
{
   int a,b,add;
   double x,y,z,sum;
  public Maths_2(int a,int b)
   {
     add=a+b;
     System.out.println("addition of 2 integer is :->"+add);
    }
 public Maths_2(double x, double y, double z)
  {
    sum=x+y+z;
    System.out.println("addition of 3 float is :->"+sum);
   }
}
```

Class Maximum2

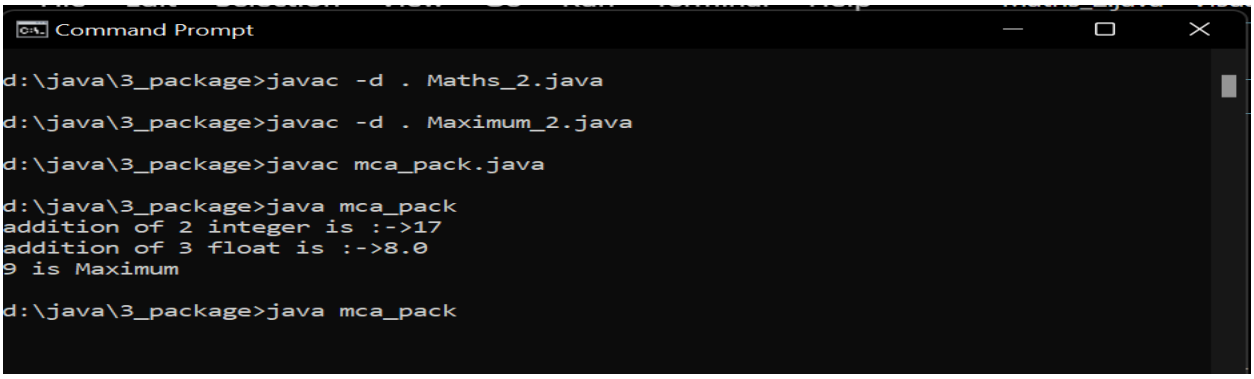
```
package MCA;
public class Maximum_2
{
   int a,b,c;
   public Maximum_2(int a,int b,int c)
    {
      if((a>b) &&(a>c))
      System.out.println(a+" is Maximum ");
       else
```

```
      {
       if(b>c)
       System.out.println(b+ " is Maximum ");
        else
       System.out.println(c+" is Maximum ");
      }
    }
}
```

Class mca_pack implemented above package:

```
import java.lang.*;
class mca_pack
{
  public static void main(String args[])
   {
    MCA.Maths_2 obj=new MCA.Maths_2(5,12);

    MCA.Maths_2 obj1=new MCA.Maths_2(3.4,1.4,3.2);
    MCA.Maximum_2 m =new MCA.Maximum_2(8,9,5);
   }
}
```

Output:



3. Create an interface Shape. Derive three classes sphere, cone and cylinder from it. Calculate area and volume of all.

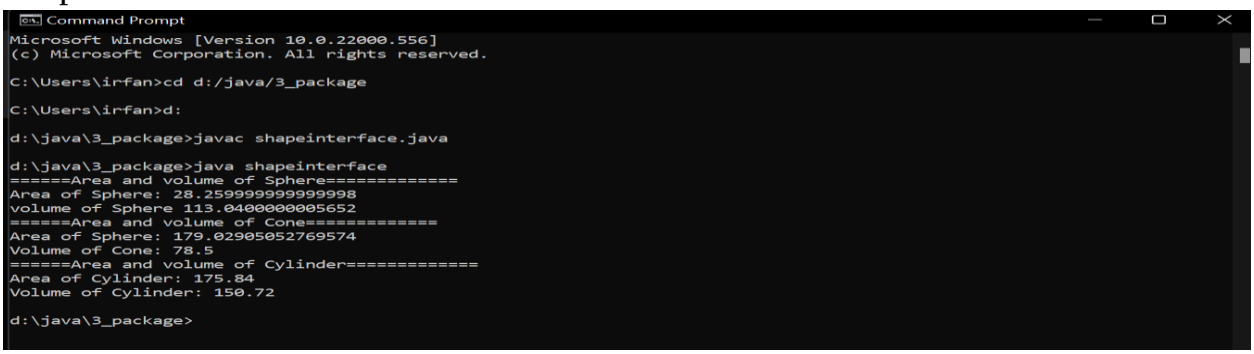
shape interface:

```
import java.io.*;
interface Shape
{
    void area();
   void volume();
}
class Sphere implements Shape
{
     int r;
   double pi=3.14;
   Sphere(int rad){
    r=rad;
    }
   @Override
   public void area()
   {
System.out.println("======Area and volume of Sphere============");
   double ar = pi * r * r;
        System.out.println("Area of Sphere: "+ar);
   }
   public void volume()
   {
     double vol=1.33333333334*pi*r*r*r;
     System.out.println("volume of Sphere "+vol);
    }
}
 class Cone implements Shape
   {
     int h;
     int r;
```

```
        double pi=3.14;
         Cone(int height,int rad)
         {
          h=height;
          r= rad;
         }
        @Override
        public void area()
        {
     System.out.println("======Area and volume of Cone============");
           double sq=h*h+r*r;
            double ar = pi * r *(r+java.lang.Math.sqrt(sq));
            System.out.println("Area of Sphere: "+ar);
        }
        public void volume()
        {
          double d=h/3;
          double vol=pi*r*r*d;
          System.out.println("Volume of Cone: "+vol);
          }
    }
    class Cylinder implements Shape
    {
         int h;
         int r;
        double pi=3.14;
Cylinder(int height,int rad){
          h=height;
          r=rad;
         }
        @Override
        public void area()
        {
```

```
System.out.println("======Area and volume of Cylinder============");

        double ar = (2*pi * r *h)+(2*pi*r*r);
        System.out.println("Area of Cylinder: "+ar);
    }
    public void volume()
    {
      double vol=pi*r*r*h;
      System.out.println("Volume of Cylinder: "+vol);
      }
}
public class shapeinterface
{
   public static void main(String[] args)
   {
       Sphere obj=new Sphere(3);
        obj.area();
        obj.volume();
       Cone obj1=new Cone(4,5);
         obj1.area();
         obj1.volume();
        Cylinder obj2 =new Cylinder(3,4);
         obj2.area();
         obj2.volume();    }
}
```

Output:



4. Create an interface StringDemo which has a methods check (). Implement interface in StringCheck and implement the method of interface StringDemo. check() will check whether two string are equal or not.

StringDemo interface:

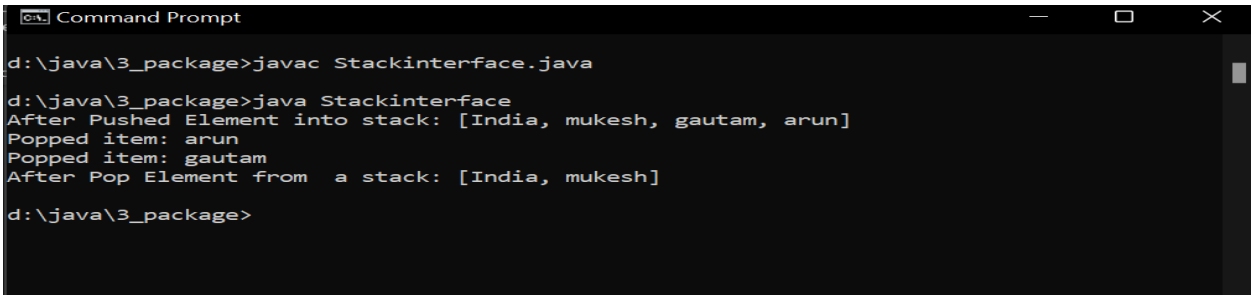
```
import java.util.Scanner;
interface StringDemo {
   public void check(String a, String b);
}
class StringCheck implements StringDemo {
   public void check(String a, String b) {
      if (a.compareTo(b) == 0) {
         System.out.println("Both String are same.");
      } else
  System.out.println("Both String are different.");
}
public class Stringinterface {
   public static void main(String args[]) {
      String a;
      String b;
      Scanner sc = new Scanner(System.in);
      System.out.print("Enter firt string: ");
      a = sc.nextLine();
      System.out.print("Enter second string: ");
      b = sc.nextLine();
      StringCheck sd= new StringCheck();
      sd.check(a, b);
   }
}
```

Output:

5. Write an interface Stack with methods push and pop. Write a class StringStack which will implement Stack interface where push will insert string in a string array and pop will remove a string.

```
import java.util.*;
interface Stack1 {
   public void display();
}
class StringStack implements Stack1 {
   Stack<String> STACK = new Stack<String>();
   public void display() {
      STACK.push("India");
      STACK.push("mukesh");
      STACK.push("gautam");
      STACK.push("arun");
      System.out.println("After Pushed Element into stack: " + STACK);
      System.out.println("Popped item: " + STACK.pop());
      System.out.println("Popped item: " + STACK.pop());
      System.out.println("After Pop Element from  a stack: " + STACK);
   }
}
public class Stackinterface {
   public static void main(String args[]) {
      Stack1 st = new StringStack();
      st.display();
   }
}
```

Output:



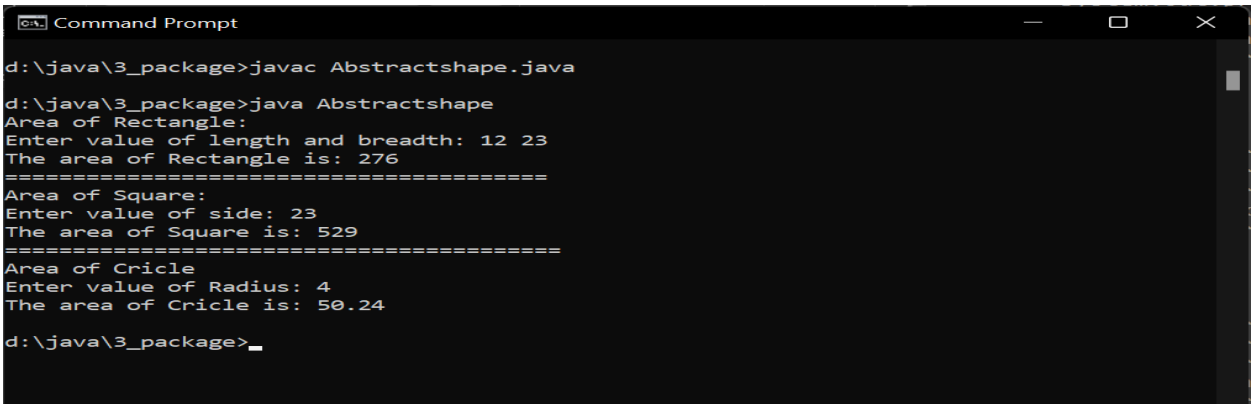
6. Create an abstract class Shape and also create Square, Circle and Rectangle hierarchy display the area of above shapes.

Abstract class Shape:

```
import java.util.*;
abstract class Shape {
   int l, b, radius, Side;
   Scanner sc = new Scanner(System.in);
   abstract void printArea();
}
class Rectangle extends Shape {
   void printArea() {
      System.out.println("Area of Rectangle:");
      System.out.print("Enter value of length and breadth: ");
      l = sc.nextInt();
      b = sc.nextInt();
      System.out.println("The area of Rectangle is: " + l * b);
   }
}
class Square extends Shape {
   void printArea() {

System.out.println("=======================================");
      System.out.println("Area of Square:");
      System.out.print("Enter value of side: ");
      Side = sc.nextInt();
      System.out.println("The area of Square is: " + Side * +Side);
   }
}
class Cricle extends Shape {
   void printArea() {

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

```
        System.out.println("Area of Cricle");
        System.out.print("Enter value of Radius: ");
        radius = sc.nextInt();
        System.out.println("The area of Cricle is: " + 3.14f * radius * radius);
    }
}

public class Abstractshape {
    public static void main(String[] args) {
        Rectangle rec = new Rectangle();
        rec.printArea();
        Square tri = new Square();
        tri.printArea();
        Cricle cri = new Cricle();
        cri.printArea();
    }
}
```

Output:



4. Design an Application using String, StingBuilder and StringTokenizer

1. Program to demonstrate the String.

```
import java.io.*;
import java.util.*;
class StringEx{

    public static void main(String args[]){
        Scanner sc=new Scanner(System.in);
        System.out.println("enter your address");
         String a=sc.nextLine();
        System.out.println("you have address is");
        System.out.println(" "+a);
      }
}
```

Output:

```
 azam campus pune
PS D:\java\4_string> javac StringEx.java
PS D:\java\4_string> java StringEx
enter your address
azam campus pune,india
you have entered address is
 azam campus pune,india
PS D:\java\4_string>
```

2. Program to demonstrate the StringBuilder.

```
import java.io.*;
class StringBuilderEx{
      public static void main(String args[])throws IOException{
        StringBuilder sb=new StringBuilder();
        BufferedReader br=new BufferedReader(new
InputStreamReader(System.in));
        System.out.println(" enter streetname");
        String street=br.readLine();
        System.out.println("enter area name");
        String area=br.readLine();
        System.out.println("enter villagename");
         String village=br.readLine();

          //joining three string into one
           sb.append(street);
            sb.append(area);
            sb.append(village);
        System.out.println("address is: "+sb);
         //capacity of sb object
         System.out.println("capacity: "+sb.capacity());
           //number of characters
         System.out.println("number of characters in above string: "+sb.length());
     }
}
```

Output:

```
 azam campus pune
PS D:\java\4_string> javac StringEx.java
PS D:\java\4_string> java StringEx
enter your address
azam campus pune,india
you have entered address is
 azam campus pune,india
enter area name
camp
enter villagename
pune,maharastra
address is: hidayaullah road punecamppune,maharastra
capacity: 70
```

3. Program to demonstrate the StringTokenizer.

```
import java.io.*;

import java.util.*;

class StringTokEx{

    public static void main(String args[]) throws Exception{

     String fullname;

      BufferedReader br=new BufferedReader(new InputStreamReader(System.in));

       System.out.println("enter your full name");

         fullname=br.readLine();

    StringTokenizer st =new StringTokenizer(fullname);

       //st.append(fullname);

      int C=st.countTokens();

        System.out.println("fullname: "+C);

         while(st.hasMoreTokens()){

         System.out.println(st.nextToken()); }

     }
}
```

Output:

```
PS D:\java\4_string> javac StringTokEx.java
PS D:\java\4_string> java StringTokEx
enter your full name
irfanbeg
fullname: 1
irfanbeg
PS D:\java\4_string> java StringTokEx
enter your full name
mirzabeg irfanbeg
fullname: 2
mirzabeg
irfanbeg
PS D:\java\4_string>
```

5.Test any 5 five of standard exception and user Defined Custom Exceptions in java

Java Program to demonstrate Arithmetic Exception.

```
 import java.util.*;
 import java.io.*;
 import java.lang.*;
 public class arithematicEX {
public static void main(String[] args) {
 try{
        int n;
 Scanner sc = new Scanner(System.in);
System.out.println("Enter a number:");
 n = sc.nextInt();
 System.out.println("Entered Value is:"+n);
System.out.println("n:" +n);
 int a = 45/n;
 System.out.println("a:"+a);
 }catch(Exception ae){
 System.out.println(ae);
 System.out.println("Enter non-zero value");}
}
}
```

Output:

```
Enter a number:
23
Entered Value is:23
n:23
a:1
PS D:\java\5_exception> java arithematicEX
Enter a number:
ui
java.util.InputMismatchException
Enter non-zero value
PS D:\java\5_exception>
```

Java Program to demonstrate Null Pointer Exception.

```
public class NullPointerEx {
 public static void main(String[] args) {
 try {
 String a = null;
 System.out.println(a.charAt(0));
 }
 catch(Exception e)
 {
 System.out.println("NullPointerException..");
 }
 }

}
```

output:

```
PS D:\java\5_exception> javac .\NullPointerEx.java
PS D:\java\5_exception> java NUllPointerEx
Error: Could not find or load main class NUllPointerEx
Caused by: java.lang.NoClassDefFoundError: NullPointerEx (wrong name: NUllPointerEx)
PS D:\java\5_exception> java NullPointerEx
NullPointerException..
```

Java Program to demonstrate StringIndexOutOfBound Exception

```
import java.util.*;
public class IndexOutOfBoundsEx
{
 public static void main(String[] args)
 {
try {

 String a;
 System.out.println("Enter the String:");
Scanner s = new Scanner(System.in);
```

```
 a = s.nextLine();
char c = a.charAt(24);
 System.out.println(c);
 }
 catch(StringIndexOutOfBoundsException e) {
 System.out.println("StringIndexOutOfBoundsException");
 }
 }
}
```

Output:

```
PS D:\java\5_exception> javac IndexOutOfBoundsEx.java
PS D:\java\5_exception> java IndexOutOfBoundsEx
Enter the String:
irfan beg
StringIndexOutOfBoundsException
PS D:\java\5_exception>
```

Java Program to demonstrate FileNotFound Exception

```
import java.io.File;
import java.io.FileNotFoundException;
import java.io.FileReader;
 public class FileNotFoundEx {
 public static void main(String[] args) {

try {
 File file = new File("E://file.txt");

 FileReader fr = new FileReader(file);
 } catch (FileNotFoundException e) {
 System.out.println("File does not exist");
 }
 }
}
```

Output:

```
2 errors
PS D:\java\5_exception> javac FileNotFoundEx.java
PS D:\java\5_exception> java FileNotFoundEx
File does not exist
PS D:\java\5_exception>
PS D:\java\5_exception>
```

Java Program to demonstrate NumberFormat Exception.

```
import java.io.*;
import java.lang.*;
import java.util.*;
public class NumberNotFoundEx {
 public static void main(String[] args) {
 try
{

 int num = Integer.parseInt ("allana") ;

 System.out.println(num);
 }
 catch(NumberFormatException e) {
 System.out.println("Number format exception");
 }
 }
}
```

Output:

```
PS D:\java\5_exception>
PS D:\java\5_exception>
PS D:\java\5_exception> javac NumberNotFoundEx.java
PS D:\java\5_exception> java NumberNotFoundEx
Number format exception
PS D:\java\5_exception>
PS D:\java\5_exception>
```

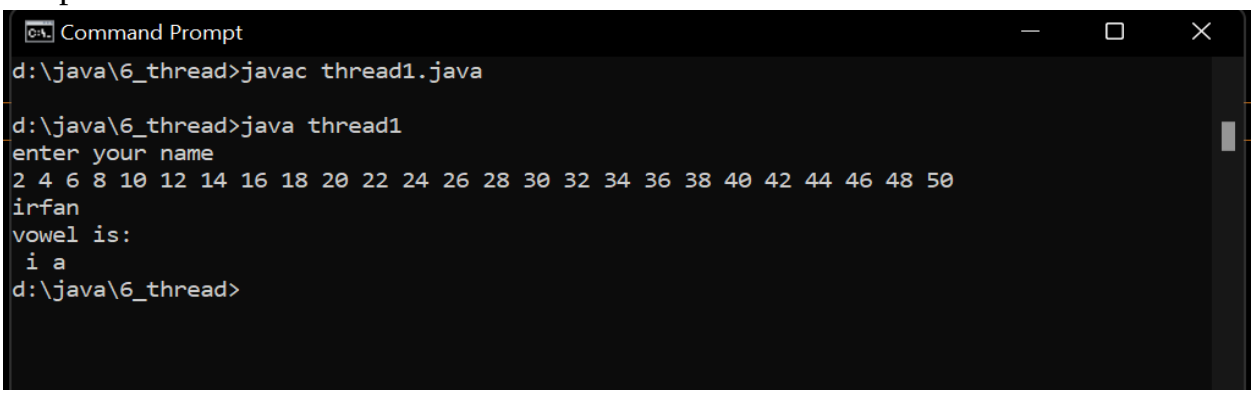
6. Threads creation and design applications by using Extending the Thread class/ Implementing the Runnable Interface. Application of multithreading in java.

1. Write a JAVA program which will create two child threads by implementing Runnable interface; one thread will print even no's from 1 to 50 and other display vowels

```
import java.io.*;
class Numbers implements Runnable{
  public void run()
  {
    for(int i=1;i<=50;i++)
    {
      if(i%2==0)
      System.out.print(i+" ");
    }
    System.out.println("name: ");
  }
}
class Vowels implements Runnable
{

    public void run()
     {
```

```
      try{
    BufferedReader br =new BufferedReader(new InputStreamReader(System.in));
    System.out.println("enter your name");
    String name=br.readLine();
    int n=name.length();
    char p[]=name.toCharArray();
    System.out.println("vowel is:");
    for(int i=0;i<n;i++){
     if(p[i]=='a'||p[i]=='e'||p[i]=='i'||p[i]=='o'||p[i]=='u')
     System.out.print(" "+p[i]);
     }
     }catch(Exception e) {}
  }
}
class thread1{
  public static void main(String args[])
  {
    Numbers n1 =new Numbers();
    Vowels v1=new Vowels();
    Thread t1=new Thread(n1);
    Thread t2=new Thread(v1);
    t1.start();
    t2.start();
  }
}
```

Output:



2. Java program to display “Hello Java” 50 times using multithreading.(Use Thread class)

```
class hello extends Thread
{

   public void run()
   {
    for(int i=1;i<=50;i++){

        System.out.println(""+i+" Hello Java"); }
    }
}
class thread2{
   public static void main(String args[])
    {
     hello h1 =new hello();


        h1.start();
    }
}
```

Output:

3. Write a JAVA program which will generate following threads

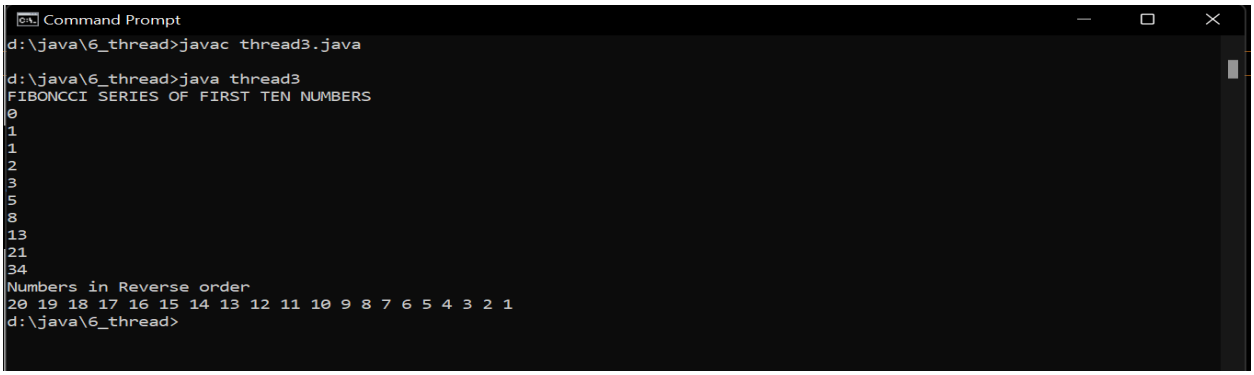
I. To display 10 terms of Fibonacci series.

II To display 1 to 20 in reverse order

```
class thread3{
  public static void main(String args[]){
   fibonacci f1=new fibonacci();
   f1.start();
  reverse r1=new reverse();
  r1.start();
   }
}
class fibonacci extends Thread
{

  public void run()
  {
    System.out.println("FIBONCCI SERIES OF FIRST TEN NUMBERS");

    try{

    int num=10;
    int n1=0,n2=1,n3=0;
    int counter=0;
     while(counter<num)
     {
      System.out.println(n1);
       n3=n2+n1;

       n1=n2;
       n2=n3;
      counter++;
       }
```

```
        System.out.println("Numbers in Reverse order");

      }catch(Exception e){}
    }
}

class reverse extends Thread
{

   public void run(){
     try{
   // System.out.println("\n============================");

    for(int i=20;i>=1;i--)
    {
      System.out.print(+i+" ");

    }

   }catch(Exception e){ }
 }
}
```

Output:



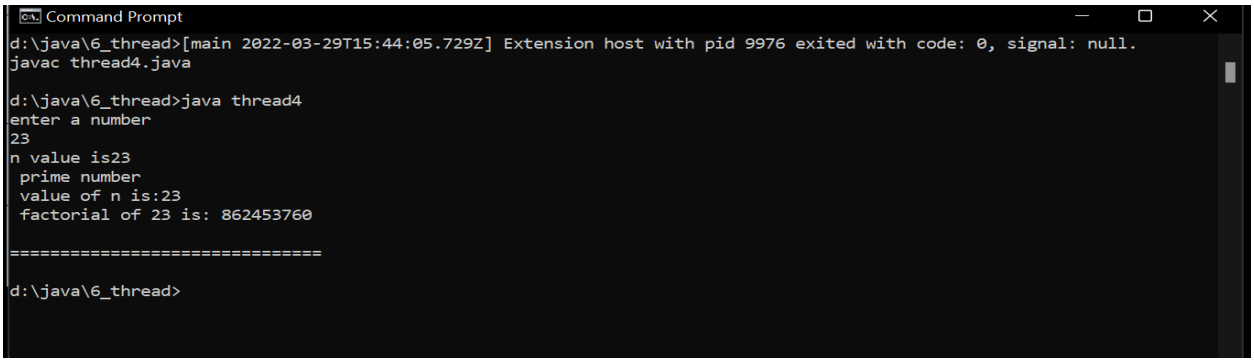
4. Write a JAVA program to accept the number from the user and do the following
   - Calculate Factorial of a given Number.
   - To check whether given number is prime or not.(Use Thread and Runnable)

```
import java.io.*;

class thread4
{
  public static void main(String args[])
   {
    try{
   BufferedReader br =new BufferedReader(new
InputStreamReader(System.in));
   System.out.println("enter a number");
   String input = br.readLine();

   int num = Integer.parseInt(input);

    factorial f =new factorial(num);
    f.start();
    prime p=new prime(num);
      p.start();
   }catch(Exception e){}
  }
}
class factorial extends Thread
{
   int n;
  public factorial(int num)
   {
```

```
     this.n=num;
    }
    public void run()
    {

      System.out.println(" value of n is:"+n);
       int fact=1;int result=1;
     for(int i=1;i<=n;i++)
      {
        result=fact*i*result;
        }
      System.out.println(" factorial of "+n+" is: "+result);

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

}
class prime extends Thread
{
       int n;
      public prime(int num){
      this.n=num; }
  public void run()
   {
System.out.println("n value is" +n);
     int count=0;int c=1;
     while(c<=n)
     {
        if(n%c==0){
```

```
            count++;
           }
          c++;
        }
      if(count<=2)
       {
        System.out.println(" prime number");
       }else
       System.out.println("not a prime number");
      }
}
```

Output:



7. Design java application using Collection in java such as Array List, Link List

1. Program to demonstrate the ArrayList

```
import java.util.*;
import java.util.*;
public class arrayList1 {
   public static void main(String args[]){
    ArrayList<String> list=new ArrayList<String>();//Creating arraylist
    list.add("BMW");//Adding object in arraylist
    list.add("Audi");
    list.add("Buggati");
    list.add("Lamborgini");
    //Traversing list through Iterator
    Iterator itr=list.iterator();//getting the Iterator
    while(itr.hasNext()){//check if iterator has the elements
     System.out.println(itr.next());//printing the element and move to next
    }
   }
}
```

Output:

```
1 error
PS D:\java\7_treeset> javac arrayList1.java
PS D:\java\7_treeset> java arrayList1
BMW
Audi
Buggati
Lamborgini
PS D:\java\7_treeset>
```

2. Program to demonstrate the LinkedList

```
import java.util.*;

class LinkedListDemo
{
	public static void main(String args[])
	{
		LinkedList ll=new LinkedList();
		System.out.println (ll.size());

		ll.add("A");
		ll.add("B");
		ll.add("C");
		ll.add("D");
		ll.add("E");

		System.out.println (ll);

		ll.addFirst("F");
		System.out.println (ll);

		ll.addLast("G");
		System.out.println (ll);

		System.out.println (ll.contains("A"));
		System.out.println (ll.contains("L"));

		ll.removeFirst();
		System.out.println (ll);


		ll.removeLast();
```

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

            System.out.println (ll.getFirst());
            System.out.println (ll.getLast());

            Iterator itr=ll.iterator();
            while(itr.hasNext())
            {
                  System.out.println (itr.next());
            }

            ListIterator litr=ll.listIterator();
            while(litr.hasNext())
            {
                  System.out.println (litr.next());
            }

            while(litr.hasPrevious())
            {
                  System.out.println (litr.previous());
            }
      }
}
```

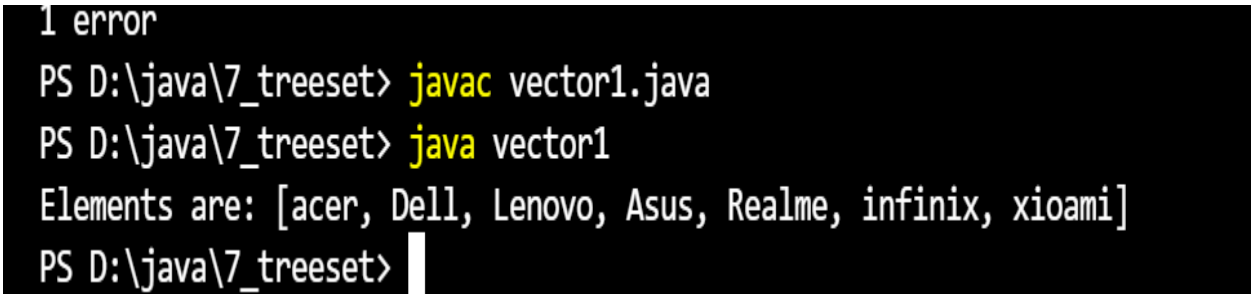
Output:

```
PS D:\java\7_treeset> javac LinkedListDemo.java
Note: LinkedListDemo.java uses unchecked or unsafe operations.
Note: Recompile with -Xlint:unchecked for details.
PS D:\java\7_treeset> java LinkedListDemo
0
[A, B, C, D, E]
[F, A, B, C, D, E]
[F, A, B, C, D, E, G]
true
false
[A, B, C, D, E, G]
[A, B, C, D, E]
```

3. Program to demonstrate the Vector

```
import java.util.*;
public class vector1 {

                    public static void main(String args[]) {
                      //Create a vector
                      Vector<String> vec = new Vector<String>();
                      //Adding elements using add() method of List
                      vec.add("acer");
                      vec.add("Dell");
                      vec.add("Lenovo");
                      vec.add("Asus");
                      //Adding elements using addElement() method of Vector
                      vec.addElement("Realme");
                      vec.addElement("infinix");
                      vec.addElement("xioami");

                      System.out.println("Elements are: "+vec);
                    }
}
```

Output:



4. Program to demonstrate the HashSet.

```
import java.util.*;
public class HashSet2{
 public static void main(String[] args) {
 LinkedHashSet<String> hs=new LinkedHashSet<>();
hs.add("Bisleri");
hs.add("kinley");
hs.add("coca-cola");
hs.add("pepsi");
System.out.println (hs);
System.out.println (hs.add("Bisleri"));
System.out.println (hs.contains("Bisleri"));
hs.remove("Bisleri");
System.out.println (hs);
Iterator itr=hs.iterator();
while(itr.hasNext())
{
System.out.println (itr.next());
}
hs.clear();
System.out.println (hs);
 }
}
```

Output:

```
PS D:\java\7_treeset> javac HashSet2.java
PS D:\java\7_treeset> java HashSet2
[Bisleri, kinley, coca-cola, pepsi]
false
true
[kinley, coca-cola, pepsi]
kinley
coca-cola
pepsi
```

5.Program to demonstrate the TreeSet.

```
import java.util.*;
class TreeSetDemo{
public static void main(String[] args)
{
Set<String> ts1 = new TreeSet<>();
ts1.add("pune");
ts1.add("nanded");
ts1.add("aurangabad");
ts1.add("delhi");
System.out.println(ts1);
}
}
```

Output:

```
pepsi
[]
PS D:\java\7_treeset> javac TreeSetDemo.java
PS D:\java\7_treeset> java TreeSetDemo
[aurangabad, delhi, nanded, pune]
PS D:\java\7_treeset>
```

6. Program to demonstrate the HashTable.

```
import java.util.*;
public class HashtableDemo{
 public static void main(String[] args) {
 Hashtable<String,String> h=new Hashtable<String,String>();
h.put("Milkshake","Mango");
h.put("Icecream","Chocolate");
h.put("Colddrink","Coke");
Enumeration<String> e=h.elements();
while(e.hasMoreElements()){
System.out.println (e.nextElement());}
System.out.println ("---------------------");
Set<Map.Entry<String,String>> s=h.entrySet();
System.out.println (s);
System.out.println ("----------------------------");
Enumeration<String> e1=h.keys();
while(e1.hasMoreElements()){
System.out.println (e1.nextElement());}
System.out.println ("---------------------");
Set<String> s1=h.keySet();
System.out.println (s1);
System.out.println ("---------------------");
Collection<String> c=h.values();
System.out.println (c);
 }
}
```

Output:

```
PS D:\java\7_treeset> javac HashtableDemo.java
PS D:\java\7_treeset> java  HashtableDemo
Mango
Coke
Chocolate
---------------------
[Milkshake=Mango, Colddrink=Coke, Icecream=Chocolate]
----------------------------
Milkshake
Colddrink
Icecream
---------------------
[Milkshake, Colddrink, Icecream]
```

7. Program to demonstrate the HashMap.

```
import java.util.*;
public class HashMapDemo {


 public static void main(String args[]){
        HashMap<Integer,String> map=new HashMap<Integer,String>();
        map.put(1,"Nokia");  //Put elements in Map
        map.put(2,"Apple");
        map.put(3,"Oneplus");
        map.put(4,"Micromax");
        System.out.println("Iterating Hashmap...");
        for(Map.Entry m : map.entrySet()){
         System.out.println(m.getKey()+" "+m.getValue());
        }
      }
      }
```

Output:

```
[Mango, Coke, Chocolate]
PS D:\java\7_treeset> javac HashMapDemo.java
PS D:\java\7_treeset> java HashMapDemo
Iterating Hashmap...
1 Nokia
2 Apple
3 Oneplus
4 Micromax
PS D:\java\7_treeset>
```

8.Program to demonstrate the TreeMap.

```
import java.util.*;
public class Q7_TreeMap {

                public static void main(String args[]){
                  TreeMap<Integer,String> map=new
TreeMap<Integer,String>();
                    map.put(100,"jessica");
                    map.put(102,"Alon");
                    map.put(101,"Vitalik");
                    map.put(103,"jack");

                    for(Map.Entry m:map.entrySet()){
                     System.out.println(m.getKey()+" "+m.getValue());
                    }
                 }
                }
```

Output:

```
PS D:\java\7_treeset> javac Q7_TreeMap.java
PS D:\java\7_treeset> java Q7_TreeMap
100 jessica
101 Vitalik
102 Alon
103 jack
PS D:\java\7_treeset>
```

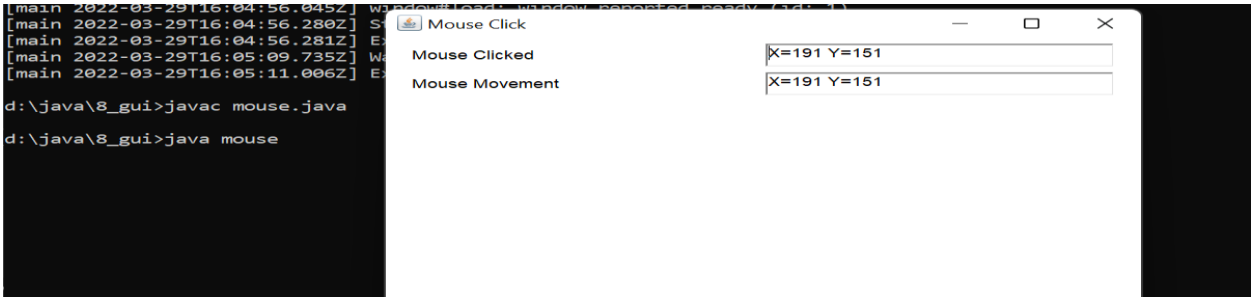
8. Design GUI based java application using AWT, Swing with Event Handling.

1. Design a screen in Java to handle the Mouse Events such as MOUSE_MOVED and MOUSE_CLICK and display the position of the Mouse_Click in a TextField.

```
import java.awt.*;

import java.awt.event.*;

import java.io.*;

import javax.swing.*;

class frame2 extends JFrame

{

    JPanel p = new JPanel();

    frame2 ()

     { setVisible(true);

       setSize(400,400);

       setTitle("Swing Background");

        add(p);


      p.setBackground(Color.BLACK);

      addWindowListener(new WindowAdapter()
```

```
        {
          public void windowClosing(WindowEvent e)
          {
            p.setBackground(Color.Blue);
            JOptionPane.showMessageDialog(null,"BackGraound Color is"+
            p.getBackground(),"Color ",JOptionPane.INFORMATION_MESSAGE);
            new frame2 ().show();
           }
        });
      }
  public static void main(String args[])
   {
     new frame2 ().show();
    }
}
```

Output:

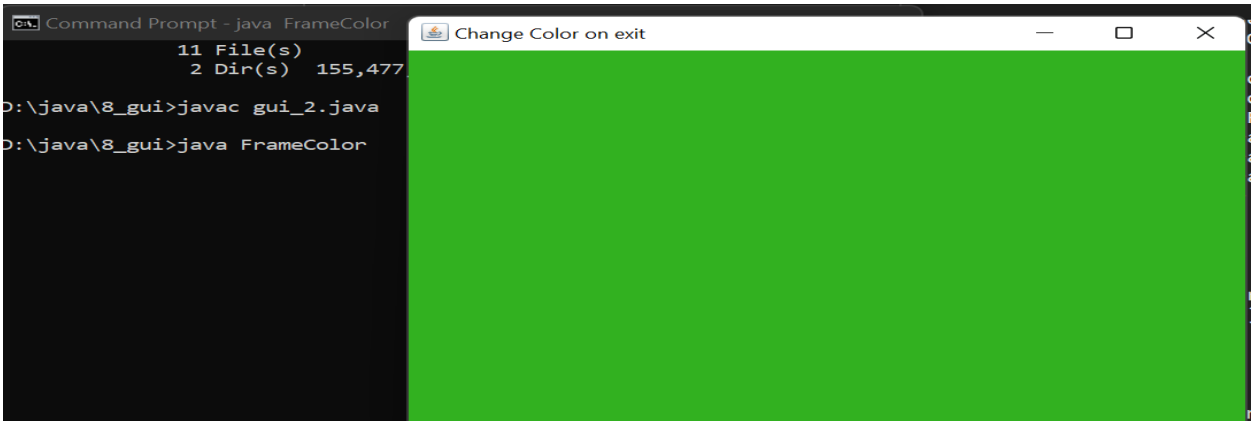


2. Write a Java program that will create a frame if we try to close it, it should change its color and it remains visible on the screen import java.util.*;

```
import javax.swing.*;

import java.awt.*;

import java.awt.event.*;

class MySwing extends JFrame {

   Random rand;

   Color randomColor;

   MySwing() {

      super("Change Color on exit");

      setLayout(new FlowLayout());


      setSize(500,500);

      setVisible(true);

      addWindowListener(new MyClose());

      setDefaultCloseOperation(JFrame.DO_NOTHING_ON_CLOSE);

   }

   class MyClose extends WindowAdapter {

      public void windowClosing(WindowEvent e) {

         rand = new Random();

         float r = rand.nextFloat();
```

```
            float g = rand.nextFloat();
            float b = rand.nextFloat();
            randomColor = new Color(r, g, b);
            repaint();
        }
    }
    public void paint(Graphics g) {
        getContentPane().setBackground(randomColor);
    }
}
class FrameColor {
    public static void main(String[] args) {
        MySwing obj= new MySwing();
    }
}
```

Output:



3. Design a screen to take Personal Information (First Name, Last Name, Address, Mobile Number, Gender, Your Interest (Checkbox)- Computer, Sports, Music) and display the details on another screen with a click of submit button. import javax.swing.*;

```
import java.awt.*;

import java.awt.event.*;

class MyFrame

    extends JFrame

    implements ActionListener {


    // Components of the Form

    private Container c;

    private JLabel title;

    private JLabel firstname;

    private JTextField tfirstname;

    private JLabel mno;

    private JTextField tmno;

    private JLabel lastname;

    private JTextField tlastname;

    private JLabel gender;

    private JRadioButton male;

    private JRadioButton female;
```

```
  private ButtonGroup gengp;
  private JLabel youinterest;
  private JLabel add;
  private JTextArea tadd;
  private JCheckBox computer;
  private JCheckBox sports;
  private JCheckBox music;
  private JButton sub;
  private JButton reset;
  private JTextArea tout;
  private JLabel res;
  private JTextArea resadd;
public MyFrame()
  {
     setTitle("Registration Form");
     setBounds(300, 90, 900, 600);
     setDefaultCloseOperation(EXIT_ON_CLOSE);
     setResizable(false);

     c = getContentPane();
     c.setLayout(null);
```

```
title = new JLabel("Registration Form");
title.setFont(new Font("Arial", Font.PLAIN, 30));
title.setSize(300, 30);
title.setLocation(300, 30);
c.add(title);

firstname = new JLabel("FirstName");
firstname.setFont(new Font("Arial", Font.PLAIN, 20));
firstname.setSize(100, 20);
firstname.setLocation(100, 100);
c.add(firstname);

tfirstname = new JTextField();
tfirstname.setFont(new Font("Arial", Font.PLAIN, 15));
tfirstname.setSize(190, 20);
tfirstname.setLocation(200, 100);
c.add(tfirstname);


lastname = new JLabel("LastName");
lastname.setFont(new Font("Arial", Font.PLAIN, 20));
lastname.setSize(100, 20);
```

```
lastname.setLocation(100, 100);
c.add(lastname);

tlastname = new JTextField();
tlastname.setFont(new Font("Arial", Font.PLAIN, 15));
tlastname.setSize(190, 20);
tlastname.setLocation(200, 100);
c.add(tlastname);

add = new JLabel("Address");
add.setFont(new Font("Arial", Font.PLAIN, 20));
add.setSize(100, 20);
add.setLocation(100, 300);
c.add(add);

tadd = new JTextArea();
tadd.setFont(new Font("Arial", Font.PLAIN, 15));
tadd.setSize(200, 75);
tadd.setLocation(200, 300);
tadd.setLineWrap(true);
c.add(tadd);
```

```
mno = new JLabel("Mobile");
mno.setFont(new Font("Arial", Font.PLAIN, 20));
mno.setSize(100, 20);
mno.setLocation(100, 150);
c.add(mno);

tmno = new JTextField();
tmno.setFont(new Font("Arial", Font.PLAIN, 15));
tmno.setSize(150, 20);
tmno.setLocation(200, 150);
c.add(tmno);

gender = new JLabel("Gender");
gender.setFont(new Font("Arial", Font.PLAIN, 20));
gender.setSize(100, 20);
gender.setLocation(100, 200);
c.add(gender);

male = new JRadioButton("Male");
male.setFont(new Font("Arial", Font.PLAIN, 15));
male.setSelected(true);
male.setSize(75, 20);
```

```
male.setLocation(200, 200);
c.add(male);

female = new JRadioButton("Female");
female.setFont(new Font("Arial", Font.PLAIN, 15));
female.setSelected(false);
female.setSize(80, 20);
female.setLocation(275, 200);
c.add(female);

gengp = new ButtonGroup();
gengp.add(male);
gengp.add(female);

youinterest = new JLabel("Your Interest");
youinterest.setFont(new Font("Arial", Font.PLAIN, 20));
youinterest.setSize(100, 20);
youinterest.setLocation(100, 100);
c.add(youinterest);

computer = new JCheckBox("Computer");
computer.setFont(new Font("Arial", Font.PLAIN, 15));
```

```
computer.setSize(250, 20);
computer.setLocation(150, 400);
c.add(computer);

sports = new JCheckBox("Sports");
sports.setFont(new Font("Arial", Font.PLAIN, 15));
sports.setSize(250, 20);
sports.setLocation(150, 400);
c.add(sports);

music = new JCheckBox("Music");
music.setFont(new Font("Arial", Font.PLAIN, 15));
music.setSize(250, 20);
music.setLocation(150, 400);
c.add(music);

sub = new JButton("Submit");
sub.setFont(new Font("Arial", Font.PLAIN, 15));
sub.setSize(100, 20);
sub.setLocation(150, 450);
sub.addActionListener(this);
c.add(sub);
```

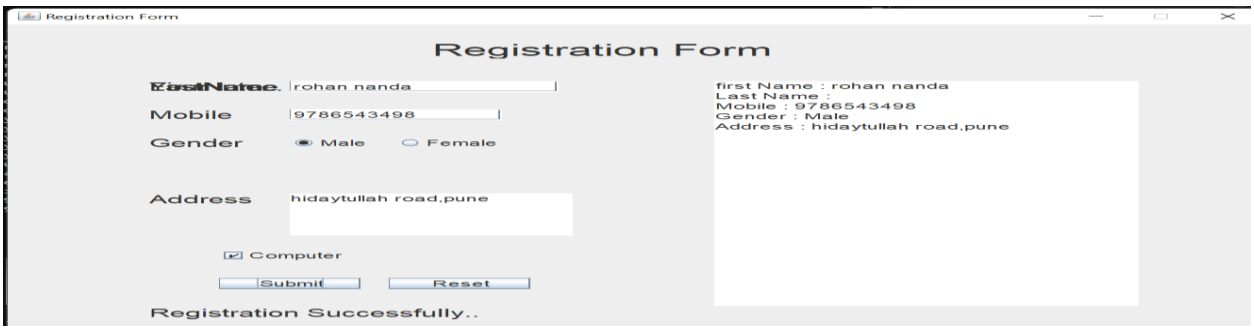
```
reset = new JButton("Reset");
reset.setFont(new Font("Arial", Font.PLAIN, 15));
reset.setSize(100, 20);
reset.setLocation(270, 450);
reset.addActionListener(this);
c.add(reset);

tout = new JTextArea();
tout.setFont(new Font("Arial", Font.PLAIN, 15));
tout.setSize(300, 400);
tout.setLocation(500, 100);
tout.setLineWrap(true);
tout.setEditable(false);
c.add(tout);
res = new JLabel("");
res.setFont(new Font("Arial", Font.PLAIN, 20));
res.setSize(500, 25);
res.setLocation(100, 500);
c.add(res);

resadd = new JTextArea();
```

```
        resadd.setFont(new Font("Arial", Font.PLAIN, 15));
        resadd.setSize(200, 75);
        resadd.setLocation(580, 175);
        resadd.setLineWrap(true);
        c.add(resadd);
        setVisible(true);
    }
public void actionPerformed(ActionEvent e)
    {
        if (e.getSource() == sub) {
            if (computer.isSelected()) {
                String data1;
                String data
                    = "first Name : "
                      + tfirstname.getText() + "\n"
                      + "Last Name : "
                      + tlastname.getText() + "\n"
                      + "Mobile : "
                      + tmno.getText() + "\n";
                if (male.isSelected())
                    data1 = "Gender : Male"
                            + "\n";
```

```
            else
                data1 = "Gender : Female"
                        + "\n";
            String data2 = "Address : " + tadd.getText();
            tout.setText(data + data1 + data2);
            tout.setEditable(false);
            res.setText("Registration Successfully..");
        }
        else {
            tout.setText("");
            resadd.setText("");
            res.setText("computer"
                        + " sports & music");
        }
    }
    else if (e.getSource() == reset) {
        String def = "";
        tfirstname.setText(def);
       tlastname.setText(def);
        tadd.setText(def);
        tmno.setText(def);
        //tcomputer.setSelected(false);
```

```
            //tsports.setSelected(false);
            //tmusic.setSelected(false);
            res.setText(def);
            tout.setText(def);
            //term.setSelected(false);
            resadd.setText(def);
        }
    }
}
// Driver Code
class Registration {
    public static void main(String[] args) throws Exception
    {
        MyFrame f = new MyFrame();
    }
}
```

Output:



4. Write a Java program to design a screen using Swing that will create four TextFields. First for the text, second for what to find, and third for replacing. Display results in the fourth TextField. Display the count of total no. of replacements made. The button clear to clear the TextFields.
import javax.swing.*;

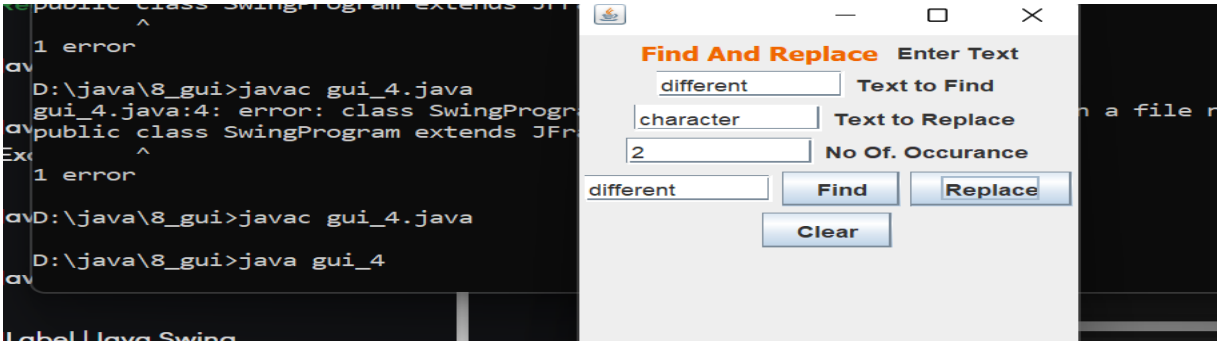
```
import java.awt.*;

public class gui_4 extends JFrame {
   JTextField jTextField1;
   JTextField jTextField2;
   JTextField jTextField3;
   JTextField jTextField4;

   public gui_4() {
      JLabel jLabel1 = new JLabel(" Find And Replace ");
      JLabel jLabel2 = new JLabel("Enter Text ");
      jTextField1 = new JTextField(10);
      JLabel jLabel3 = new JLabel("Text to Find ");
      jTextField2 = new JTextField(10);
      JLabel jLabel4 = new JLabel("Text to Replace ");
      jTextField3 = new JTextField(10);
      JLabel jLabel5 = new JLabel("No Of. Occurance");
      jTextField4 = new JTextField(10);
      JButton jButton1 = new JButton();
      JButton jButton2 = new JButton();
      JButton jButton3 = new JButton();
      setDefaultCloseOperation(WindowConstants.EXIT_ON_CLOSE);

      jLabel1.setFont(new java.awt.Font("Tahoma", 1, 14));
      jLabel1.setForeground(new java.awt.Color(240, 102, 0));
      jButton1.setText("Find");
```

```
jButton1.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton1ActionPerformed(evt);
    }
});

jButton2.setText("Replace");
jButton2.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton2ActionPerformed(evt);
    }
});

jButton3.setText("Clear");
jButton3.addActionListener(new java.awt.event.ActionListener() {
    public void actionPerformed(java.awt.event.ActionEvent evt) {
        jButton3ActionPerformed(evt);
    }
});

Container contentPane = getContentPane();
JPanel p = new JPanel();
p.add(jLabel1);
p.add(jLabel2);
p.add(jTextField1);
p.add(jLabel3);
p.add(jTextField2);
p.add(jLabel4);
p.add(jTextField3);
p.add(jLabel5);
p.add(jTextField4);
p.add(jButton1);
p.add(jButton2);
```

```
    p.add(jButton3);
    contentPane.add(p);
}

void jButton3ActionPerformed(java.awt.event.ActionEvent evt) {
    jTextField1.setText("");
    jTextField2.setText("");
    jTextField3.setText("");
    jTextField4.setText("");
}

void jButton1ActionPerformed(java.awt.event.ActionEvent evt) {
    int cnt = 0;
    String Str1 = jTextField1.getText();
    int len = (jTextField2.getText()).length();
    for (int i = 0; i < Str1.length() - (len - 1); i++) {
        String substr = Str1.substring(i, i + len);
        jTextField4.setText("" + cnt);
        if (substr.equals(jTextField2.getText())) {
            cnt++;
        }
    }
    jTextField4.setText("" + cnt);
}

void jButton2ActionPerformed(java.awt.event.ActionEvent evt) {
    String str = jTextField1.getText();
    String nstr = str.replace(jTextField2.getText(), jTextField3.getText());
    jTextField4.setText(nstr);

}
public static void main(String args[]) {
    gui_4 nf = new gui_4();
```

```
        nf.setVisible(true);
        nf.setSize(280, 220);
        nf.setResizable(true);
    }
}
```

Output:



5. Write a Java program to design a screen using AWT that will take a user name and password. If the user name and password are not the same, raise an Exception with an appropriate message. Users can have 3 login chances only. Use the clear button to clear the TextFields.

```
import javax.swing.*;

import java.awt.*;

import java.awt.event.*;


public class gui_5 extends JFrame implements ActionListener {

    JPanel p, p1, p2;

    JLabel name, pass;

    String a, b;
```

```
int attempts = 0;
JTextField t1, t2;
JButton b1, b2;

public gui_5() {
    setTitle("Login Form");
    setSize(800, 760);
    GridBagLayout gb = new GridBagLayout();
    GridBagConstraints c = new GridBagConstraints();
    setLayout(gb);
    window close = new window();
    addWindowListener(close);
    p = new JPanel();
    c.gridx = 1;
    c.gridy = 1;
    gb.setConstraints(p, c);
    add(p);

    name = new JLabel("Username");
    c.gridx = 1;
```

```
c.gridy = 1;
gb.setConstraints(name, c);
p.add(name);
t1 = new JTextField(20);
c.gridx = 1;
c.gridy = 2;
gb.setConstraints(t1, c);
p.add(t1);
p1 = new JPanel();
c.gridx = 1;
c.gridy = 2;
gb.setConstraints(p1, c);
add(p1);

pass = new JLabel("Password");
c.gridx = 1;
c.gridy = 2;
gb.setConstraints(pass, c);
p1.add(pass);
t2 = new JTextField(20);
```

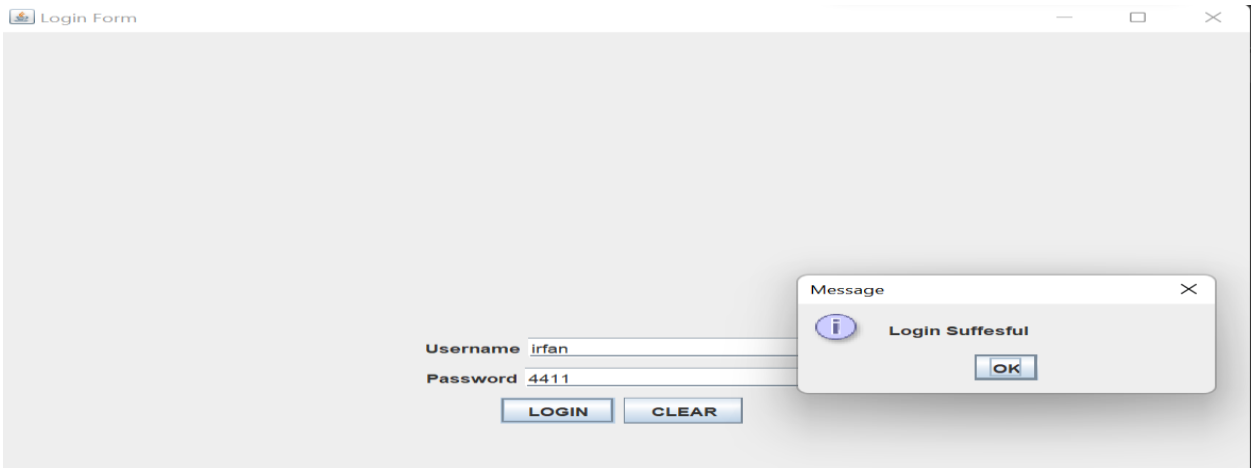
```
c.gridx = 1;
c.gridy = 2;
gb.setConstraints(t2, c);
p1.add(t2);
p2 = new JPanel();
c.gridx = 1;
c.gridy = 3;
gb.setConstraints(p2, c);
add(p2);

b1 = new JButton("LOGIN");
c.gridx = 1;
c.gridy = 3;
gb.setConstraints(b1, c);
p2.add(b1);

b2 = new JButton("CLEAR");
c.gridx = 1;
c.gridy = 4;
gb.setConstraints(b2, c);
```

```
        p2.add(b2);
        b1.addActionListener(this);
        b2.addActionListener(this);
    }

    class LoginException extends Exception {
        LoginException() {
            JOptionPane.showMessageDialog(null, "Exception!!! Invalid Username or Password");
        }
    }

    public void actionPerformed(ActionEvent e) {
        String cmd = e.getActionCommand();
        try {
            if (cmd.equals("LOGIN")) {
                a = t1.getText();
                b = t2.getText();
                if ((a.equals("irfan")) && (b.equals("4411"))) {
                    JOptionPane.showMessageDialog(null, "Login Suffesful");
```

```
            } else {
                attempts++;
                if (attempts >= 3) {
                    b1.setEnabled(false);
                    JOptionPane.showMessageDialog(null, "Limit is exceeded Try After Sometime");
                } else {
                    throw new LoginException();
                }
            }
        }
    } catch (Exception er) {System.out.println(er);}

    if (cmd.equals("CLEAR")) {
        t1.setText("");
        t2.setText("");
    }
}

public class window extends WindowAdapter {
```

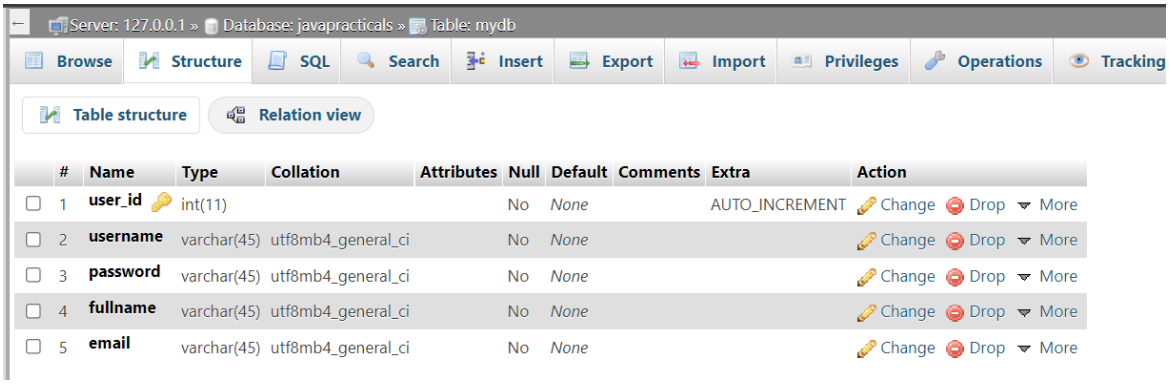
```
        public void windowClosing(WindowEvent e) {
            System.exit(0);
        }
    }
    public static void main(String a[]) {
        gui_5 fb = new gui_5();
        fb.setVisible(true);
    }
}
```

Output:



9. Design and implement JDBC applications.

1. JDBC Menu Driver Program to demonstrate CRUD operations.




```
//Connectivity to Db
String dbURL = "jdbc:mysql://localhost:3306/mydb";
String username = "";
String password = "";

try {

    Connection conn = DriverManager.getConnection(dbURL, username,
password);

    if (conn != null) {
        System.out.println("Connected");
    }
} catch (SQLException ex) {
    ex.printStackTrace();
}
```

1) Create or insert record

```
import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.PreparedStatement;

import java.sql.SQLException;

public class JdbcInsertDemo {

    public static void main(String[] args) {

        String dbURL = "jdbc:mysql://localhost:3306/mydb";

        String username = "", password = "";


        try (Connection conn = DriverManager.getConnection(dbURL,
username, password)) {


            String sql = "INSERT INTO Users (username, password,
fullname, email) VALUES (?, ?, ?, ?)";


            PreparedStatement statement = conn.prepareStatement(sql);

            statement.setString(1, "Elon");

            statement.setString(2, "1236");

            statement.setString(3, "Polkadot Man");

            statement.setString(4, "Dot.crypto@Blockchain.com");


            int rowsInserted = statement.executeUpdate();
```

```
                if (rowsInserted > 0) {
                        System.out.println("A new user was inserted
successfully!");
                }
            } catch (SQLException ex) {
                ex.printStackTrace();
            }
        }
    }
```

- Options

	user_id	username	password	fullname	email
Edit Copy Delete	1	Elon	1236	Polkadot Man	Dot.crypto@Blockchain.com

2) Select record

```
String sql = "SELECT * FROM Users";

Statement statement = conn.createStatement();
ResultSet result = statement.executeQuery(sql);

int count = 0;

while (result.next()){
    String name = result.getString(2);
    String pass = result.getString(3);
    String fullname = result.getString("fullname");
    String email = result.getString("email");

    String output = "User %d: %s - %s - %s - %s";
    System.out.println(String.format(output, ++count, name, pass, fullname, email));
```

```
}
```

Output:-

User 1: Elon - 1236 – Polkadot Man – Dot.crypto@Blockchain.com

3) Update Statement

```
String sql = "UPDATE Users SET password=?, fullname=?, email=? WHERE
username=?";

PreparedStatement statement = conn.prepareStatement(sql);
statement.setString(1, "1234567");
statement.setString(2, "William Henry Rohan Raut");
statement.setString(3, "Rohan.Raut@RRTek.com");
statement.setString(4, "Rohan");

int rowsUpdated = statement.executeUpdate();
if (rowsUpdated > 0) {
   System.out.println("An existing user was updated successfully!");
}
```

Output:-

- 123l4567 –William Henry Rohan Raut – Rohan.Raut@RRTek.com - Rohan

4) Delete Statement

```
String sql = "DELETE FROM Users WHERE username=?";

PreparedStatement statement = conn.prepareStatement(sql);
statement.setString(1, "bill");

int rowsDeleted = statement.executeUpdate();
if (rowsDeleted > 0) {
   System.out.println("A user was deleted successfully!");
}
```

Output:-

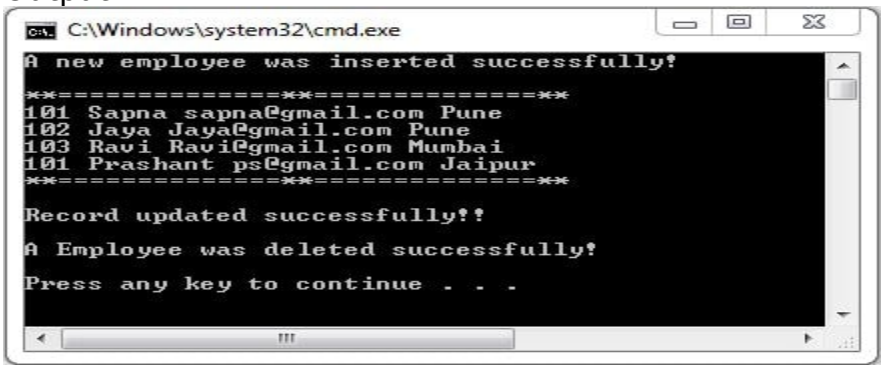
no records found

2. JDBC GUI Application to demonstrate CRUD operations.

```
import java.sql.*;
class EmployeeRecord {
    public static final String DBURL = "jdbc:oracle:thin:@localhost:1521:XE";
    public static final String DBUSER = "local";
    public static final String DBPASS = "test";
    public static void main(String args[]) {
        try {
            //Loading the driver
            Class.forName("oracle.jdbc.driver.OracleDriver");
            //Cretae the connection object
    Connection con = DriverManager.getConnection(DBURL, DBUSER, DBPASS);
            //Insert the record
      String sql = "INSERT INTO emp (emp_id, empname, email, city)
VALUES (?, ?, ?, ?)";
            PreparedStatement statement = con.prepareStatement(sql);
            statement.setInt(1, 100);
            statement.setString(2, "Prashant");
            statement.setString(3, "prasant@saxena.com");
            statement.setString(4, "Pune");
            int rowsInserted = statement.executeUpdate();
            if (rowsInserted > 0) {
             System.out.println("A new employee was inserted successfully!\n");
            }
            // Display the record
            String sql1 = "SELECT * FROM Emp";
            Statement stmt = con.createStatement();
            ResultSet result = stmt.executeQuery(sql1);
            while (result.next()) {
                System.out.println (result.getInt(1)+" "+
                result.getString(2)+" "+
                result.getString(3)+" "+
```

```
                result.getString(4));
            }
            //Update the record
            String sql2 = "Update Emp set email = ? where empname = ?";
            PreparedStatement pstmt = con.prepareStatement(sql2);
            pstmt.setString(1, "Jaya@gmail.com");
            pstmt.setString(2, "Jaya");
            int rowUpdate = pstmt.executeUpdate();
            if (rowUpdate > 0) {
                System.out.println("\nRecord updated successfully!!\n");
            }
            //Delete the record
            String sql3 = "DELETE FROM Emp WHERE empname=?";
            PreparedStatement statement1 = con.prepareStatement(sql3);
            statement1.setString(1, "Prashant");
            int rowsDeleted = statement1.executeUpdate();
          if (rowsDeleted > 0) {
                System.out.println("A Employee was deleted successfully!\n");   }
        }
        catch(Exception ex) {
            ex.printStackTrace(); }
    }
}
```

Output:-



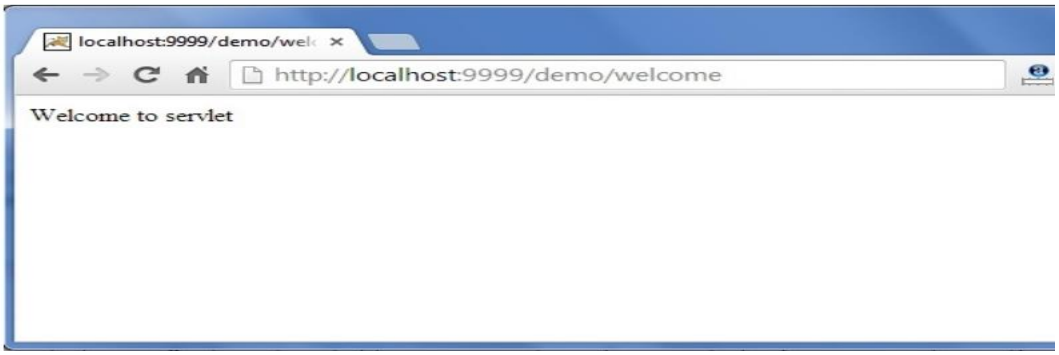
10. Design and implement servlet applications.

1. Program to demonstrate Servlet Application

```
import java.io.*;
import javax.servlet.*;
import javax.servlet.http.*;

// Extend HttpServlet class
public class Hello extends HttpServlet {
  private String message;
  public void init() throws ServletException {
    // Do required initialization
    message = "Welcome to Servlet";
  }
  public void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {

    // Set response content type
    response.setContentType("text/html");
    // Actual logic goes here.
```

```
    PrintWriter out = response.getWriter();
    out.println("<p>" + message + "</p>");
  }
  public void destroy() {
    // do nothing.
  }
}
//in html
<servlet>
  <servlet-name> Welcome to Servlet </servlet-name>
  <servlet-class> Welcome to Servlet </servlet-class>
</servlet>
<servlet-mapping>
  <servlet-name> Welcome to Servlet </servlet-name>
  <url-pattern>Welcome to Servlet </url-pattern>
</servlet-mapping>
```

Output: -



11. Design and implement JSP applications

1. Program to demonstrate the JSP application.

Test.jsp(File name)

```
<html>
   <head><title>current time</title></head>
   <body>
      <form>
         <fieldset style="width:20%; background-color: white;">
            <legend><h1><b>Current time<b></h1></legend>
            <p>Current Time is :</p>
            <% java.util.Date d = new java.util.Date();
            out.println(d.toString()); %>
         </fieldset>
      </form>
   </body>
</html>
```

Web.xml(File name)

```
<web-app>
    <servlet>
        <servlet-name>xyz</servlet-name>
        <jsp-file>/test.jsp</jsp-file>
    </servlet>
    <servlet-mapping>
        <servlet-name>xyz</servlet-name>
        <url-pattern>/test</url-pattern>
    </servlet-mapping>
</web-app>
```

Output: -