Qno1

```
import java.util.Scanner;
public class q1
{
	public static void main(String args[])
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the value of n");
		int n=sc.nextInt();
		int max,min,i,pos1=0,pos2=0,c=0,f=0;
		int m[]=new int[n];
		System.out.println("enter "+n+" elements");
		for(i=0;i<n;i++)
		{
			m[i]=sc.nextInt();
		}
		max=m[0];
		min=m[0];
		for(i=1;i<n;i++)
		{
			max=(int)(Math.max(max,m[i]));
			min=(int)(Math.min(min,m[i]));
		}
		for(i=0;i<n;i++)
		{
```

```
                if(m[i]==max)
                {
                        f=f+1;
                        if(f==1)
                                pos1=i;
                }
                else if(m[i]==min)
                {
                        c=c+1;
                        if(c==1)
                                pos2=i;

                }
        }
        System.out.println("Maixmum="+max+" no. of occurences="+f);
        System.out.println("Maximum First occurences="+pos1+" position");
        System.out.println("Minimum="+min+" no. of occurences="+c);
        System.out.println("Minimum First occurences="+pos2+" position");
    }
}
```

Qno2

```
public class q2
{
    public static void main(String args[])
```

```
    {
        int M=Integer.parseInt(args[0]);
        int N=Integer.parseInt(args[1]);
        int i;
        int m[]=new int[M];
        for(i=0;i<M;i++)
        {
            m[i]=0+(int)(Math.random()*(N));
        }
        for(i=0;i<M;i++)
        {
            System.out.print(+m[i]+" ");
        }
    }
```

Qno3

```
public class q3
{
    public static void main(String args[])
    {
        int N=Integer.parseInt(args[0]);
        int n,i,j,k,c=0;
        int m[]=new int[N];
        for(i=0;;i++)
        {
            n=0+(int)(Math.random()*(N));
```

```
                System.out.print(+n+" ");
                for(j=0;j<N;j++)
                {
                    if(j==n)
                    {
                        m[j]=1;
                    }
                }
                for(k=0;k<N;k++)
                {
                    if(m[k]==1)
                    {
                        c=c+1;
                    }
                }
                if(c==N)
                {
                    break;
                }
                c=0;
            }
        }
}
```

Qno4

```
public class q4
```

```
{
	public static void main(String args[])
	{
		int i,j;
		int N=Integer.parseInt(args[0]);
		int m[]=new int[N+1];
		for(i=2;i<=N;i++)
		{
			if(m[i]==0)
			{
				for(j=(i+1);j<=N;j++)
				{
					if(j%i==0)
					{
						m[j]=1;
					}
				}
			}
		}
		System.out.println("All prime No.'s are :-");
		for(i=2;i<=N;i++)
		{
			if(m[i]==0)
			{
				System.out.print(+i+" ");
```

```
                }
            }
        }
}
Qno5
import java.util.Scanner;
public class q5
{
        public static void main(String args[])
        {
                Scanner sc=new Scanner(System.in);
                System.out.println("Enter the value of N");
                int i,j;
                int N=sc.nextInt();
                int m[]=new int[N+1];
                System.out.println("Enter the array elements between 1 to "+N);
                for(i=0;i<N;i++)
                {
                        int n=sc.nextInt();
                        if(n<1||n>N)
                        {
                        i--;
                        System.out.println("Invalid input");
                        }
                        else
```

```
                {
                m[n]=m[n]+1;
                }
        }

        for(i=1;i<=N;i++)
        {
                if(m[i]>1)
                {
                        System.out.println("Duplicate present");
                        System.exit(0);
                }
        }
        System.out.println("Duplicate not present");
    }
}
```

Qno6

```
import java.util.Scanner;
public class q6
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        double m[]=new double[10];
        int i;
```

```
        System.out.println("Enter 10 double values");
        for(i=0;i<10;i++)
        {
                m[i]=sc.nextDouble();
        }
        double av1=average(m);
        System.out.println("Average in double datatype="+av1);
        int n[]=new int[10];
        for(i=0;i<10;i++)
        {
                n[i]=(int)(m[i]);
        }
        int av2=average(n);
        System.out.println("Average in integer datatype="+av2);
}
public static double average(double m[])
{
        int i;
        double av1=0.0,s=0.0;
        for(i=0;i<10;i++)
        {
                s=s+m[i];
        }
        av1=s/10;
        return(av1);
```

```
    }
    public static int average(int m[])
    {
        int av2=0,s=0,i;
        for(i=0;i<10;i++)
        {
            s=s+m[i];
        }
        av2=s/10;
        return(av2);
    }
}
```

Qno7

```
import java.util.Scanner;
public class q7
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter a String");
        String str=sc.nextLine();
        System.out.println("Original String:-"+str);
        String tmp=sort(str);
        System.out.println("Sorted String:-"+tmp);
    }
```

```
public static String sort(String str)
{
	int l=str.length();
	String s[]=new String[l];
	String tmp="",t="";int i,j;
	for(i=0;i<l;i++)
	{
		tmp=tmp+str.charAt(i);;
		s[i]=tmp;
		tmp="";
	}
	for(i=0;i<l;i++)
	{
		for(j=0;j<(l-1);j++)
		{
			if(s[j].compareTo(s[j+1])>0)
			{
				t=s[j];
				s[j]=s[j+1];
				s[j+1]=t;
			}
		}
	}
	for(i=0;i<l;i++)
	{
```

```
                tmp=tmp+s[i];
            }
            return(tmp);
        }
}
```

Qno8

```
import java.util.Scanner;
public class q8
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the length of the array");
        int n=sc.nextInt();
        System.out.println("Enter the array elements");
        int m[]=new int[n];
        int i,j,k=0;
        System.out.println("Enter "+n+" integers in array");
        for(i=0;i<n;i++)
        {
            m[i]=sc.nextInt();
        }
        int pos=0,max=0;
        for(i=0;i<n;i++)
        {
```

```
System.out.print(+m[i]+" ");
j=i;
while(j<n)
{
	if(m[i]==m[j])
	{
		k=k+1;
		j++;
	}
	else
	{
		break;
	}

}

if(k>max)
{
	if((i==0)&&((j==n)||(m[j]<m[i])))
	{
		max=k;
		pos=i;
	}
	else if((i==(n-1))&&(m[i-1]<m[i]))
	{
```

```
                        max=k;
                        pos=i;
                    }
                    else if(i!=0)
                    {
                        if((m[i-1]<m[i])&&((j==n)||(m[j]<m[i])))
                        {
                            max=k;
                            pos=i;
                        }
                    }
                }
                k=0;
            }
            System.out.println("Maximum length="+max+" postion="+pos);
        }
}
```

Qno9

```
import java.util.Scanner;
public class q9
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the value of N");
```

```
int N=sc.nextInt();
int m[]=new int[N];
int i,j=1,p=0,k=0,f=0,n;
for(i=0;i<N;i++)
{
    m[i]=j;
    j++;
}
j=0;
System.out.println("All array elements are as follows");
for(i=0;i<N;i++)
{
      System.out.println(+m[i]+" ");
}
for(i=0;i<N;i++)
{
      m[i]=0;
}
for(i=0;i<N;i++)
{
      n=1+(int)(Math.random()*(N));
      for(j=0;j<N;j++)
      {
            if(m[j]==n)
            {
```

```
                k=1;
            }
        }
        if(k==1)
        {
            i--;
        }
        else
        {
            m[i]=n;
        }
        k=0;
}
System.out.println("User choice");
for(i=0;i<N;i++)
{
        System.out.println(+m[i]);
}
for(i=0;i<N-1;i++)
{
        p=m[i]-m[i+1];
        if(p!=-1)
        {
            k=k+1;
        }
```

```
                else
                {
                        f=f+1;
                }
        }
        if(m[N-1]-m[0]==-1)
        {
                f=f+1;
        }
        else
        {
                k=k+1;
        }
        System.out.println("Like Hood of Songs not played in sequence="+k);
        System.out.println("Like Hood of Songs played in sequence="+f);
    }
}
```

Qno10

```
import java.util.Scanner;
public class q10
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        int N=Integer.parseInt(args[0]);
```

```
int a[]=new int[N];
int b[]=new int[N];
int i,k;
for(i=0;i<N;i++)
{
	a[i]=Integer.parseInt(args[i+1]);
}
System.out.println("Array elements are as follows:-");
for(i=0;i<N;i++)
{
	System.out.println(+a[i]+" ");
}
for(i=0;i<N;i++)
{
	b[a[i]]=i;
}
System.out.println("Inverse array");
for(i=0;i<N;i++)
{
	System.out.print(+b[i]+" ");
}
k=0;
for(i=0;i<N;i++)
{
	if(a[b[i]]!=b[a[i]])
```

```
                {
                        k=1;
                        break;
                }
        }
        if(k==1)
        {
                System.out.println("Not a valid permutation");
        }
        else
        {
                System.out.println("Valid permutation");
        }
    }
}
```

Qno11

```
public class q11
{
    public static void main(String args[])
    {
        int m[]=new int[501];
        int i,j,k=0;
        System.out.println("Original Array");
        System.out.println("No. bulb switch off=500");
        for(i=2;i<501;i++)
```

```
        {
            for(j=i;j<501;j++)
            {
                if(j%i==0)
                {
                    if(m[j]==0)
                    m[j]=1;
                    else if(m[j]==1)
                    m[j]=0;
                }
            }
        }
        System.out.println("Final Array");
        for(i=1;i<501;i++)
        {
            if(m[i]==0)
            k=k+1;
        }
        System.out.println("No. switch bulb off="+k);
    }
}
```

Qno12

```
import java.util.Scanner;
public class q12
{
```

```
public static void main(String args[])
{
	Scanner sc=new Scanner(System.in);
	System.out.println("Enter the order of 1st Square Matrix in term of n");
	int n=sc.nextInt();
	boolean a[][]=new boolean[n][n];
	System.out.println("Enter the order of 2nd Square Matrix in term of m");
	int m=sc.nextInt();
	boolean b[][]=new boolean[m][m];
	boolean c[][]=new boolean[n][m];
	boolean s=false;
	int i,j,k;
	if(m==n)
	{
		System.out.println("Enter the boolean array elements of matrix 1");
		for(i=0;i<n;i++)
		{
			for(j=0;j<n;j++)
			{
			a[i][j]=sc.nextBoolean();
			}
		}
		System.out.println("Enter the boolean array elements of matrix 2");
		for(i=0;i<m;i++)
		{
```

```
        for(j=0;j<n;j++)
        {
        b[i][j]=sc.nextBoolean();
        }
}
System.out.println("Array 1:-");
for(i=0;i<n;i++)
{
        for(j=0;j<n;j++)
        {
        System.out.print(a[i][j]+" ");
        }
        System.out.println();
}
System.out.println("Array 2:-");
for(i=0;i<m;i++)
{
        for(j=0;j<m;j++)
        {
        System.out.print(b[i][j]+" ");
        }
        System.out.println();
}
for(i=0;i<n;i++)
{
```

```
                for(j=0;j<m;j++)
                {
                        for(k=0;k<m;k++)
                        {
                                s=s|(a[i][k]&b[k][j]);
                        }
                        c[i][j]=s;
                        s=false;
                }
        }
        System.out.println("Final Matrix:-");
        for(i=0;i<n;i++)
        {
                for(j=0;j<m;j++)
                {
                        System.out.print(c[i][j]+" ");
                }
                System.out.println();
        }
    }
    else
    {
        System.out.println("Multiplication not possible");
    }
}
```

```
}
```

Qno13

```
import java.util.Scanner;
public class q13
{
	public static void main(String args[])
	{
		Scanner sc=new Scanner(System.in);
		System.out.println("Enter the number of rows and columns of the array respectively:-");
		int r=sc.nextInt();
		int c=sc.nextInt();
		double m[][]=new double[r][c];
		int i,j;
		System.out.println("Enter the array elements");
		for(i=0;i<r;i++)
		{
			for(j=0;j<c;j++)
			{
				m[i][j]=sc.nextDouble();
			}
		}
		int pos[]=locateLargest(m);
		System.out.println("The location of the largest element is at:-("+pos[0]+","+pos[1]+")");
	}
	public static int[] locateLargest(double m[][])
```

```
    {
        double max=m[0][0];
        int i,r=0,c=0,j;
        for(i=0;i<m.length;i++)
        {
            for(j=0;j<m[i].length;j++)
            {
                if(m[i][j]>max)
                {
                    max=m[i][j];
                    r=i;
                    c=j;
                }
            }
        }
        int pos[]=new int[2];
        pos[0]=r;
        pos[1]=c;
        return(pos);
    }
}
```

Qno14

```
import java.util.Scanner;
public class q14
{
```

```
public static void main(String args[])
{
	Scanner sc=new Scanner(System.in);
	System.out.println("Enter the row of the matrix");
	int r=sc.nextInt();
	int m[][]=new int[r][2];
	int i,j;
	System.out.println("Enter the array elements in "+r+"*2 matrix");
	for(i=0;i<r;i++)
	{
		for(j=0;j<2;j++)
		{
			m[i][j]=sc.nextInt();
		}
	}
	System.out.println("Original Array:-");
	for(i=0;i<r;i++)
	{
		for(j=0;j<2;j++)
		{
			System.out.print(+m[i][j]+" ");
		}
		System.out.println();
	}
	sort(m);
```

```
}
public static void sort(int m[][])
{
	int i,j,k,t1=0;
	j=0;
	for(i=0;i<m.length;i++)
	{
		for(j=0;j<m.length-1;j++)
		{
			if(m[j][0]>m[j+1][0])
			{
				t1=m[j][0];
				m[j][0]=m[j+1][0];
				m[j+1][0]=t1;
				t1=m[j][1];
				m[j][1]=m[j+1][1];
				m[j+1][1]=t1;
			}
			else if(m[j][0]==m[j+1][0])
			{
				if(m[j][1]>m[j+1][1])
				{
					t1=m[j][0];
				m[j][0]=m[j+1][0];
				m[j+1][0]=t1;
```

```
                        t1=m[j][1];
                        m[j][1]=m[j+1][1];
                        m[j+1][1]=t1;
                        }
                    }
            }
            }

           System.out.println("Sorted Array");
            for(i=0;i<m.length;i++)
            {
                for(j=0;j<2;j++)
                {
                    System.out.print(+m[i][j]+" ");
                }
                System.out.println();
            }
        }
}
```

Qno15

```
import java.util.Scanner;
public class q15
{
    public static void main(String args[])
    {
```

```
Scanner sc=new Scanner(System.in);
double m[][]=new double[3][3];
int i,j;
System.out.println("Enter the array elements in 3*3 matrix");
for(i=0;i<3;i++)
{
	for(j=0;j<3;j++)
	{
		m[i][j]=sc.nextDouble();
	}
}
System.out.println("Array elements are as follows:-");
for(i=0;i<3;i++)
{
	for(j=0;j<3;j++)
	{
		System.out.print(+m[i][j]+" ");
	}
	System.out.println();
}
boolean r=isMarkovMatrix(m);
if(r==true)
System.out.println("Markov Matrix");
else
System.out.println("Not Markov Matrix");
```

```
}
public static boolean isMarkovMatrix(double[][] m)
{
	int i,j,k=0;
	double s=0.0;
	for(i=0;i<3;i++)
	{
		for(j=0;j<3;j++)
		{
			if(m[j][i]<0)
			{
				k=1;
				break;
			}
			else
			{
				s=s+m[j][i];
			}
		}

		if(k==1)
		{
			break;
		}
		else
```

```
                {
                    if(s!=1)
                    {
                        k=1;
                        break;
                    }
                }
                s=0.0;
            }
            if(k==1)
            {
                return(false);
            }
            else
            {
                return(true);
            }
        }
}
```

Qno16

```
import java.util.Scanner;
public class q16
{
    public static void main(String args[])
    {
```

```
Scanner sc=new Scanner(System.in);
double m[][]=new double[3][3];
int i,j;
System.out.println("Enter a 3-by-3 matrix:-");
for(i=0;i<3;i++)
{
	for(j=0;j<3;j++)
	{
		m[i][j]=sc.nextDouble();
	}
}
System.out.println("Display a 3-by-3 matrix:-");
for(i=0;i<3;i++)
{
	for(j=0;j<3;j++)
	{
		System.out.print(+m[i][j]+" ");
	}
	System.out.println();
}
double r[][]=sortRows(m);
System.out.println("Sorted matrix");
for(i=0;i<3;i++)
{
	for(j=0;j<3;j++)
```

```
                {
                        System.out.print(+m[i][j]+" ");
                }
                System.out.println();
        }
    }
    public static double[][] sortRows(double[][] m)
    {
        int i,j;
        double t=0.0;
        for(i=0;i<3;i++)
        {
            for(j=0;j<2;j++)
            {
                if(m[i][j]>m[i][j+1])
                {
                    t=m[i][j];
                    m[i][j]=m[i][j+1];
                    m[i][j+1]=t;
                }
            }
        }
        return(m);
    }
}
```

Qno17

```
import java.util.Scanner;
public class q17
{
	public static void main(String args[])
	{
		Scanner sc=new Scanner(System.in);
		double m[][]=new double[3][3];
		int i,j;
		System.out.println("Enter a 3-by-3 matrix:-");
		for(i=0;i<3;i++)
		{
			for(j=0;j<3;j++)
			{
				m[i][j]=sc.nextDouble();
			}
		}
		System.out.println("Display a 3-by-3 matrix:-");
		for(i=0;i<3;i++)
		{
			for(j=0;j<3;j++)
			{
				System.out.print(+m[i][j]+" ");
			}
			System.out.println();
```

```
        }
        double r[][]=sortColumns(m);
        System.out.println("Sorted matrix");
        for(i=0;i<3;i++)
        {
                for(j=0;j<3;j++)
                {
                        System.out.print(+m[i][j]+" ");
                }
                System.out.println();
        }
}
public static double[][] sortColumns(double[][] m)
{
        int i,j;
        double t=0.0;
        for(i=0;i<3;i++)
        {
                for(j=0;j<2;j++)
                {
                        if(m[j][i]>m[j+1][i])
                        {
                                t=m[j][i];
                                m[j][i]=m[j+1][i];
                                m[j+1][i]=t;
```

```
                    }
                }
            }
            return(m);
        }
    }
```