

# ARRAYS

## Two Dimensional Arrays

### Program 1:

```
package array2d;

public class Array {

    public static void main(String[] args) {

        int marks[][]=new int[3][4];

        marks[0][0]=51;
        marks[0][1]=52;
        marks[0][2]=53;
        marks[0][3]=54;
        marks[1][0]=61;
        marks[1][1]=62;
        marks[1][2]=63;
        marks[1][3]=64;
        marks[2][0]=71;
        marks[2][1]=72;
        marks[2][2]=73;
        marks[2][3]=74;

        for(int i=0;i<marks.length;i++)
        {

            for(int j=0;j<marks[i].length;j++)
            {
```

```

        System.out.print(marks[i][j]+" ");

    }

    System.out.println();

}

}

}

```

## Output:



```

Console x Coverage Declaration Terminal 1
<terminated> Array [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 12:58:47 am - 12:58:47 am) [pid: 12228]
51 52 53 54
61 62 63 64
71 72 73 74

```

## Program 2:

```

package array2d;

import java.util.Scanner;

public class Array1 {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

        System.out.println("please enter number of classes(rows)");

        int rows=scan.nextInt();

        System.out.println("Please enter number of students in each
class(columns)");
    }
}

```

```

    int columns=scan.nextInt();
    //creating array
    int marks[][]=new int[rows][columns];
    //storing marks for classes
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<columns;j++)
        {
            System.out.println("Please enter marks");
            marks[i][j]=scan.nextInt();
        }
    }
    //printing marks for classes
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<columns;j++)
        {
            System.out.print(marks[i][j]+" ");
        }
        System.out.println();
    }
}

```

Output:

```
Console x Coverage Declaration Terminal 1
<terminated> Array1 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:05:57 am - 1:06:12 am) [pid: 3148]
please enter number of classes(rows)
2
Please enter number of students in each class(columns)
3
Please enter marks
45
Please enter marks
67
Please enter marks
87
Please enter marks
98
Please enter marks
56
Please enter marks
78
45 67 87
98 56 78
```

## Program 3:

```
package array2d;

import java.util.Scanner;

public class Array2 {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

        System.out.println("please enter number of classes(rows)");

        int rows=scan.nextInt();

        //creating array

        int marks[][]=new int[rows][rows];

        //storing marks for classes

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

        {

            for(int j=0;j<rows;j++)

            {

                System.out.println("Please enter marksfor class

"+i+" "+"student " +j));
```

```

        marks[i][j]=scan.nextInt();
    }
}

//printling marks for classes
for(int i=0;i<rows;i++)
{
    double sum=0.0;
    for(int j=0;j<rows;j++)
    {
        sum=sum+masks[i][j];
    }
    double result=sum/rows;
    System.out.println("Average marks for class "+i+"
"+result );
}
}
}

```

## Output:

```

Console x Coverage Declaration Terminal 1
<terminated> Array2 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:09:57 am - 1:10:25 am) [pid: 3924]
please enter number of classes(rows)
3
Please enter marksfor class 0 student 0
56
Please enter marksfor class 0 student 1
68
Please enter marksfor class 0 student 2
65
Please enter marksfor class 1 student 0
95
Please enter marksfor class 1 student 1
07
Please enter marksfor class 1 student 2
76
Please enter marksfor class 2 student 0
67
Please enter marksfor class 2 student 1
80
Please enter marksfor class 2 student 2
46
Average marks for class 0 63.0
Average marks for class 1 59.333333333333336
Average marks for class 2 64.33333333333333

```

## Program 4:

```
package array2d;

public class Array2D {

    public static void main(String[] args) {

        int marks[][]=new int[3][4];

        marks[0][0]=51;
        marks[0][1]=52;
        marks[0][2]=53;
        marks[0][3]=54;
        marks[1][0]=61;
        marks[1][1]=62;
        marks[1][2]=63;
        marks[1][3]=64;
        marks[2][0]=71;
        marks[2][1]=72;
        marks[2][2]=73;
        marks[2][3]=74;

        System.out.print(marks[0][0]+" ");
        System.out.print(marks[0][1]+" ");
        System.out.print(marks[0][2]+" ");
        System.out.print(marks[0][3]+" ");
        System.out.println();

        System.out.print(marks[1][0]+" ");
        System.out.print(marks[1][1]+" ");
        System.out.print(marks[1][2]+" ");
```

```

        System.out.print(marks[1][3]+" ");
        System.out.println();

        System.out.print(marks[2][0]+" ");
        System.out.print(marks[2][1]+" ");
        System.out.print(marks[2][2]+" ");
        System.out.print(marks[2][3]+" ");

    }
}

```

Output:



```

<terminated> Array2D [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:12:47 am - 1:12:47 am) [pid: 14236]
51 52 53 54
61 62 63 64
71 72 73 74

```

## Program 5:

```

package array2d;

import java.util.Scanner;

public class Array3 {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

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

```

```

    int rows=scan.nextInt();
    double height[][]=new double [rows][rows];
    for(int i=0;i<rows;i++)
    {
        for(int j=0;j<rows;j++)
        {
            System.out.println("Please enter height for class
"+i+"student "+j);
            height[i][j]=scan.nextDouble();
        }
    }
    for(int i=0;i<rows;i++)
    {
        double maxheight=0.0;
        for(int j=0;j<rows;j++)
        {
            if(height[i][j]>maxheight)
            {
                maxheight=height[i][j];
            }

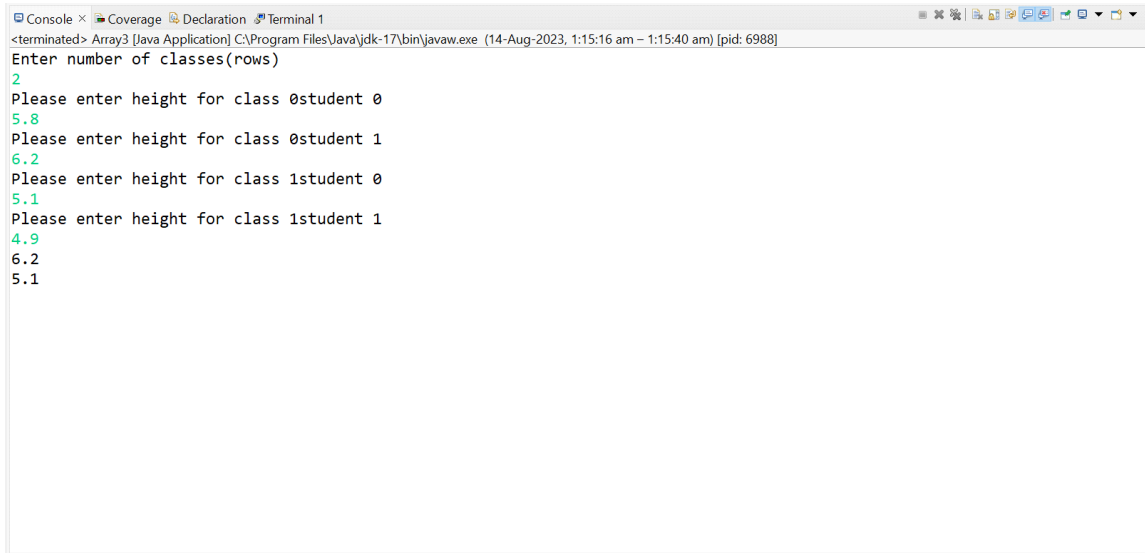
        }

        }System.out.println(maxheight);
    }
}
}

```



## Output:

A screenshot of a Java IDE terminal window. The window has tabs for 'Console', 'Coverage', 'Declaration', and 'Terminal 1'. The terminal output shows the program's execution: it prompts for the number of classes (rows), which is entered as 2. Then, it prompts for heights for two classes, each with two students. The entered values are 5.8, 6.2, 5.1, and 4.9. Finally, it prints the average height for each class, 6.2 and 5.1.

```
<terminated> Array3 [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:15:16 am - 1:15:40 am) [pid: 6988]
Enter number of classes(rows)
2
Please enter height for class 0student 0
5.8
Please enter height for class 0student 1
6.2
Please enter height for class 1student 0
5.1
Please enter height for class 1student 1
4.9
6.2
5.1
```

## Program 6:

```
package array2d;

import java .util.Scanner;

public class Cgpa {

    public static void main(String[] args) {

        double[][][] cgpa=new double[2][2][3];
        Scanner scan=new Scanner(System.in);
        for(int i=0;i<cgpa.length;i++)
        {
            for(int j=0;j<cgpa[i].length;j++)
            {
                for(int k=0;k<cgpa[i][j].length;k++)
                {
                    System.out.println("Please enter cgpa");
                    cgpa[i][j][k]=scan.nextDouble();
                }
            }
        }
    }
}
```

```

        }
    }
    for(int i=0;i<cgpa.length;i++)
    {
        for(int j=0;j<cgpa[i].length;j++)

        {
            for(int k=0;k<cgpa[i][j].length;k++)
            {
                System.out.print(cgpa[i][j][k]+" ");
            }
            System.out.println();
        }
        System.out.println();
    }
}

```

Output:

```
Console x Coverage Declaration Terminal 1
<terminated> Cgpa [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:17:06 am - 1:18:06 am) [pid: 6704]
Please enter cgpa
8.9
Please enter cgpa
7.8
Please enter cgpa
9.5
Please enter cgpa
4.3
Please enter cgpa
4.9
Please enter cgpa
7.8
Please enter cgpa
9.2
Please enter cgpa
5.8
Please enter cgpa
8.7
Please enter cgpa
6.9
Please enter cgpa
9.0
Please enter cgpa
6.4
8.9 7.8 9.5
4.3 4.9 7.8

9.2 5.8 8.7
6.9 9.0 6.4
```

## Program 7:

```
package array2d;

import java.util.Scanner;

public class DiagonalMatrix {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

        System.out.println("Please enter number of rows and columns");

        int n=scan.nextInt();

        int matrix[][]=new int[n][n];

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

        {

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

            {

                System.out.println("Please enter for row

"+i+"column"+j);
```

```

        matrix[i][j]=scan.nextInt();
    }
}
for (int i=0;i<n;i++)
{
    for(int j=0;j<n;j++)
    {
        if(i==j)
        {
            System.out.println("Diagonal matrix for d1
"+matrix[i][j]);
        }
    }

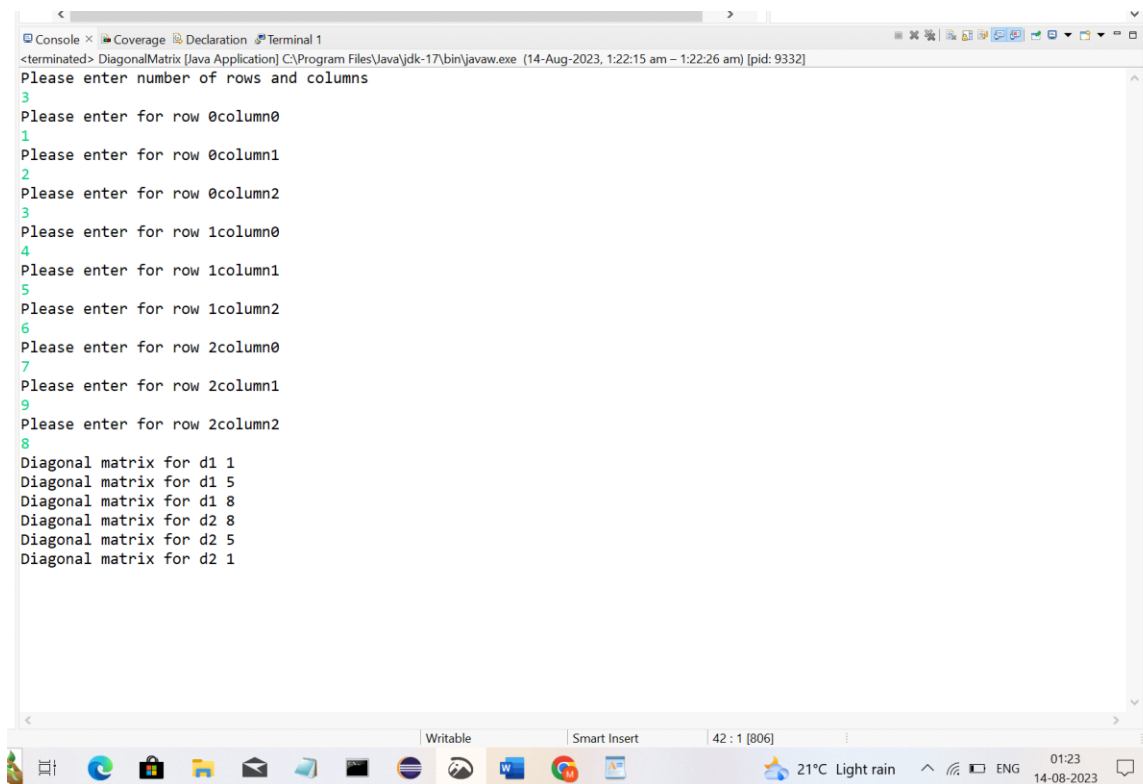
}

for(int i=n;i>=0;i--)
{
    for(int j=0;j<n;j++ )
    {
        if(i==j)
        {
            System.out.println("Diagonal matrix for d2
"+matrix[i][j]);
        }
    }
}
}

```

}

Output:



```
<terminated> DiagonalMatrix [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:22:15 am - 1:22:26 am) [pid: 9332]
Please enter number of rows and columns
3
Please enter for row 0column0
1
Please enter for row 0column1
2
Please enter for row 0column2
3
Please enter for row 1column0
4
Please enter for row 1column1
5
Please enter for row 1column2
6
Please enter for row 2column0
7
Please enter for row 2column1
9
Please enter for row 2column2
8
Diagonal matrix for d1 1
Diagonal matrix for d1 5
Diagonal matrix for d1 8
Diagonal matrix for d2 8
Diagonal matrix for d2 5
Diagonal matrix for d2 1
```

Program 8:

```
package array2d;

import java.util.Scanner;

public class HallowArray {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

        System.out.println("enter the size of an array");

        int n=scan.nextInt();

        int a[][]=new int[n][n];

        for(int i=0;i<a.length;i++)

        {
```

```

        for(int j=0;j<a[i].length;j++)
        {
            System.out.println("enter elements"+i+" "+j);
            a[i][j]=scan.nextInt();
        }
    }
    for(int i=0;i<a.length;i++)
    {
        for(int j=0;j<a[i].length;j++)
        {
            if(i==0||i==n-1||j==0||j==n-1)
            {
                System.out.print(a[i][j]+" ");
            }
            else
            {
                System.out.print(" ");
            }
        }
        System.out.println();
    }
}

```

Output:

```
Console × Coverage Declaration Terminal 1
<terminated> HallowArray [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:25:44 am - 1:26:24 am) [pid: 6288]
enter the size of an array
3
enter elements0 0
5
enter elements0 1
1
enter elements0 2
2
enter elements1 0
3
enter elements1 1
4
enter elements1 2
5
enter elements2 0
6
enter elements2 1
7
enter elements2 2
8
5 1 2
3 5
6 7 8
```

## Program 9:

```
package array2d;

import java.util.Scanner;

public class IrregularArray {

    public static void main(String[] args) {

        int age[][]=new int[3][];

        age[0]=new int[2];

        age[1]=new int[4];

        age[2]=new int[3];

        Scanner scan=new Scanner(System.in);

        for(int i=0;i<age.length;i++)

        {

            for(int j=0;j<age[i].length;j++)

            {
```

```
        System.out.println("Please enter age");
        age[i][j]=scan.nextInt();

    }

}

for(int i=0;i<age.length;i++)
{
    for(int j=0;j<age[i].length;j++)

    {
        System.out.print(age[i][j]+" ");
    }

    System.out.println();
}

}

}
```

Output:



```
Console × Coverage Declaration Terminal 1
<terminated> IrregularArray [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:27:42 am - 1:27:58 am) [pid: 7680]
Please enter age
34
Please enter age
23
Please enter age
43
Please enter age
56
Please enter age
78
Please enter age
32
Please enter age
12
Please enter age
34
Please enter age
54
34 23
43 56 78 32
12 34 54
```

## Program 10:

```
package array2d;

import java.util.Scanner;

public class RowSum {

    public static void main(String[] args) {

        Scanner scan=new Scanner(System.in);

        System.out.println("enter number of rows");

        int n=scan.nextInt();

        int a[][]=new int[n][n];

        for(int i=0;i<a.length;i++)
        {

            for(int j=0;j<a[i].length;j++)
            {

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

```

        a[i][j]=scan.nextInt();
    }
}
for(int i=0;i<a.length;i++)
{
    for( int j=0;j<a[i].length;j++)
    {
        System.out.print(a[i][j]+" ");
    }
    System.out.println();
}
//storing sum in a array
int max[]=new int [n];

for(int i=0;i<a.length;i++)
{
    int sum=0;
    for(int j=0;j<a[i].length;j++)
    {
        sum=sum+a[i][j];
    }
    max[i]=sum;
    System.out.print(sum+" ");
}
System.out.println();
//finding maximum

```

```
int m=0;
for(int i=0;i<max.length;i++)
{
    if(max[i]>m)
    {
        m=max[i];
    }
}

//finding index
int ind=0;
for(int i=0;i<max.length;i++)
{
    if(max[i]==m)
    {
        ind=i;
    }
}

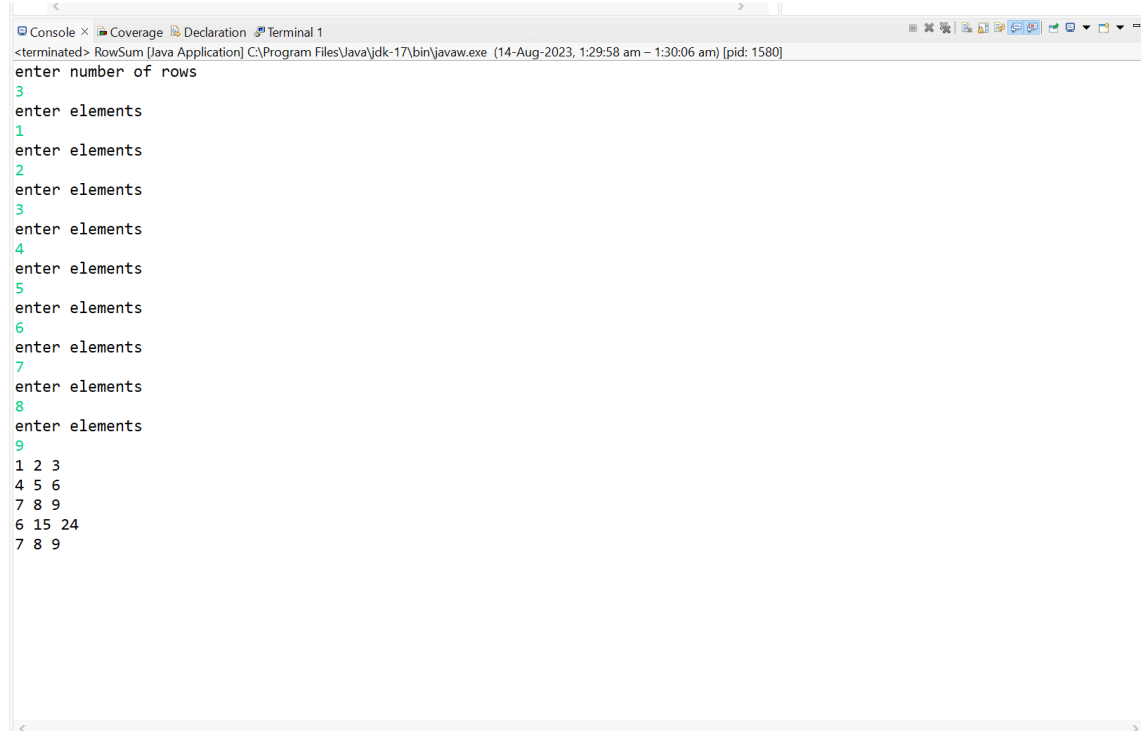
//row printing
for(int i=0;i<a.length;i++)
{
    for(int j=0;j<a[i].length;j++)
    {
        if(i==ind)
        {
            System.out.print(a[i][j]+" ");
        }
    }
}
```

```

    }
}
}
}
}

```

Output:



```

<terminated> RowSum [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:29:58 am - 1:30:06 am) [pid: 1580]
enter number of rows
3
enter elements
1
enter elements
2
enter elements
3
enter elements
4
enter elements
5
enter elements
6
enter elements
7
enter elements
8
enter elements
9
1 2 3
4 5 6
7 8 9

```

Program 11:

```

package array2d;

import java.util.Scanner;

public class Subtraction {

    public static void main(String[] args) {

        Scanner scan= new Scanner(System.in);

        System.out.println("enter the size of an array");

        int n=scan.nextInt();

        int a[][]=new int[n][n];
    }
}

```

```
int b[][]=new int[n][n];
int c[][]=new int[n][n];
for(int i=0;i<a.length;i++)
{
    for(int j=0;j<a[i].length;j++)
    {
        System.out.println("enter elements");
        a[i][j]=scan.nextInt();
    }
}
for(int i=0;i<a.length;i++)
{
    for(int j=0;j<a[i].length;j++)
    {
        System.out.print(a[i][j]+" ");
    }
    System.out.println();
}
System.out.println();
for(int i=0;i<b.length;i++)
{
    for(int j=0;j<b[i].length;j++)
    {
        System.out.println("enter elements");
        b[i][j]=scan.nextInt();
    }
}
```

```

    for(int i=0;i<b.length;i++)
    {
        for(int j=0;j<b[i].length;j++)
        {
            System.out.print(b[i][j]+" ");
        }
        System.out.println();
    }
    System.out.println();
    for(int i=0;i<c.length;i++)
    {
        for(int j=0;j<c[i].length;j++)
        {
            c[i][j]=a[i][j]-b[i][j];
            System.out.print(c[i][j]+" ");
        }
        System.out.println();
    }
}

```

Output:

```
Console x Coverage Declaration Terminal 1
<terminated> Subtraction [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:33:06 am - 1:33:16 am) [pid: 6308]
enter the size of an array
2
enter elements
1
enter elements
2
enter elements
3
enter elements
4
1 2
3 4

enter elements
4
enter elements
3
enter elements

2
enter elements
1
4 3
2 1

-3 -1
1 3
```

## Program 12:

```
package array2d;
```

```
import java.util.Scanner;
```

```
public class Transpose {
```

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

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

```
        System.out.println("enter the size of an array");
```

```
        int rows=scan.nextInt();
```

```
        System.out.println("enter the size of an array");
```

```
        int columns=scan.nextInt();
```

```
        int a[][]=new int[rows][columns];
```

```
        int b[][]=new int[columns][rows];
```

```
        for(int i=0;i<a.length;i++)
```

```
        {
```

```

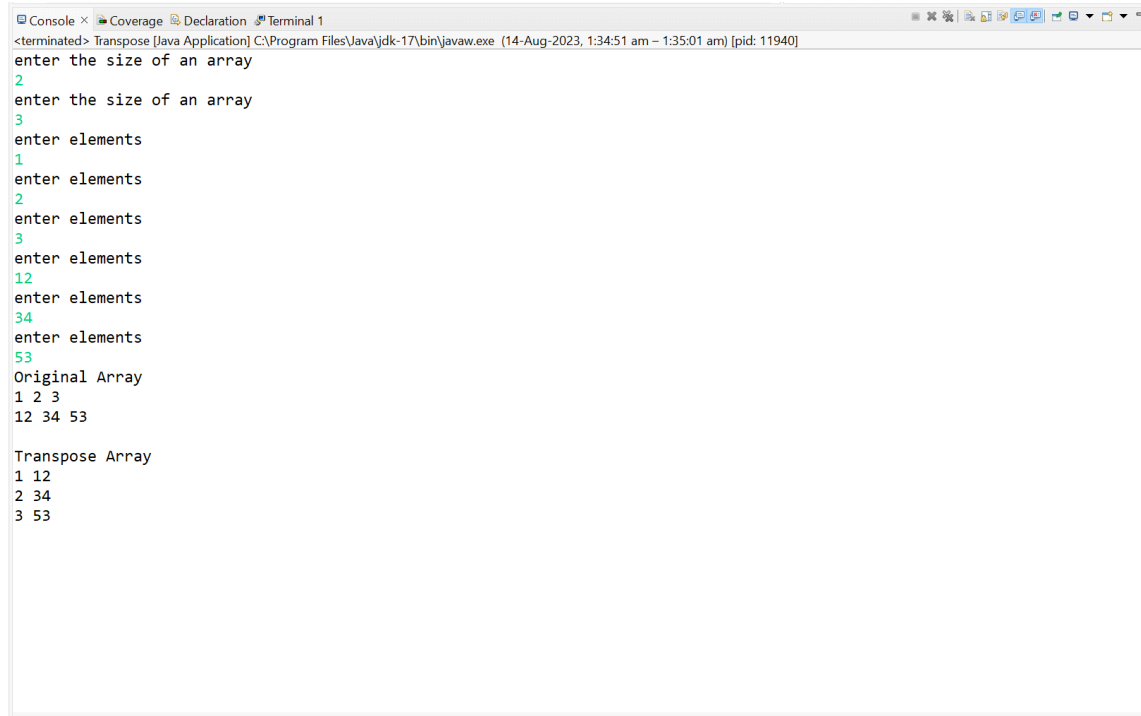
        for(int j=0;j<a[i].length;j++)
        {
            System.out.println("enter elements");
            a[i][j]=scan.nextInt();
        }
    }
    System.out.println("Original Array");
    for(int i=0;i<a.length;i++)
    {
        for(int j=0;j<a[i].length;j++)
        {
            System.out.print(a[i][j]+" ");
        }
        System.out.println();
    }
    System.out.println();
    System.out.println("Transpose Array");
    for(int i=0;i<b.length;i++)
    {
        for(int j=0;j<b[i].length;j++)
        {
            b[i][j]=a[j][i];
            System.out.print(b[i][j]+" ");
        }
        System.out.println();
    }
}

```



}

## Output:



```
Console x Coverage Declaration Terminal 1
<terminated> Transpose [Java Application] C:\Program Files\Java\jdk-17\bin\javaw.exe (14-Aug-2023, 1:34:51 am - 1:35:01 am) [pid: 11940]
enter the size of an array
2
enter the size of an array
3
enter elements
1
enter elements
2
enter elements
3
enter elements
12
enter elements
34
enter elements
53
Original Array
1 2 3
12 34 53

Transpose Array
1 12
2 34
3 53
```