LAB 3: ARRAY IMPLEMENTATION IN JAVA

Name: Shreyas Sawant Div: D7A Roll No.: 55

1-D Array

Q1. Write a program
i) To print the array in reverse order

CODE:

*RevArray - Notepad

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


          System.out.println("Elements in reverse order");
          for(int i=n-1;i>-1;i--)
            System.out.print(a[i]+" ");
          System.out.println();
        }
}
```

OUTPUT:

C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac RevArray.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java RevArray
Enter size of array
5
Enter elements of array
48
67
51
23
95
Elements in reverse order
95 23 51 67 48

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java RevArray
Enter size of array
1
Enter elements of array
5
Elements in reverse order
5

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```

ii) To reverse the array

CODE:

ArrayRev - Notepad

File Edit Format View Help

```
import java.util.*;
class ArrayRev
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of array");
          int n=s.nextInt();
          int a[]=new int[n];int temp;
          System.out.println("Enter elements of array");
          for(int i=0;i<a.length;i++)
            a[i]=s.nextInt();
          for(int i=0;i<n/2;i++)
           { temp=a[i];
            a[i]=a[n-1-i];
            a[n-1-i]=temp;}
          System.out.println("Elements in reverse order");
          for(int i=0;i<n;i++)
            System.out.print(a[i]+" ");
          System.out.println();
        }
}
```

OUTPUT:

C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac ArrayRev.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArrayRev
Enter size of array
5
Enter elements of array
6
5
4
8
7
Elements in reverse order
7 8 4 5 6

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArrayRev
Enter size of array
9
Enter elements of array
54
78
65
12
48
35
79
46
12
Elements in reverse order
12 46 79 35 48 12 65 78 54

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```

Q.2 Write a program to print the sum of the elements in an array of length n.

CODE:

ArraySum - Notepad

File Edit Format View Help

```
import java.util.*;
public class ArraySum
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of array");
          int n=s.nextInt();
          int a[]=new int[n];
          System.out.println("Enter elements of array");
          for(int i=0;i<a.length;i++)
          { a[i]=s.nextInt();
          }
          int sum=0;
          System.out.print("Sum of elements of array: ");
          for(int i=0;i<a.length;i++)
          { sum+=a[i];
          }
          System.out.println(sum);
         }
}
```

OUTPUT:

C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac ArraySum.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArraySum
Enter size of array
5
Enter elements of array
65
45
78
12
32
Sum of elements of array: 232

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArraySum
Enter size of array
8
Enter elements of array
45
1234
65
1
7
0
96
58
Sum of elements of array: 1506

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```

Q.3 Write a program to search an element entered by the user in an array.

CODE:

ArraySearch - Notepad

File Edit Format View Help

```
import java.util.*;
public class ArraySearch
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of array");
          int n=s.nextInt();
          int a[]=new int[n];
          System.out.println("Enter elements of array");
          for(int i=0;i<a.length;i++)
          { a[i]=s.nextInt();
          }
          System.out.println("Enter element to be searched");
          int f=s.nextInt();int k=0;
          for(int i=0;i<a.length;i++)
          { if(f==a[i])
             {k++;break;}
          }
          if(k==0)
           System.out.println("Not found");
          else
           System.out.println("Found");
        }
}
```

OUTPUT:

C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac ArraySearch.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArraySearch
Enter size of array
5
Enter elements of array
89
45
67
12
325
Enter element to be searched
67
Found

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java ArraySearch
Enter size of array
4
Enter elements of array
45
78
69
12
Enter element to be searched
56
Not found

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```

Q.4 Write a program to find duplicates in a given array

CODE:

MultiEntry - Notepad

File Edit Format View Help

```
import java.util.Scanner;
class MultiEntry
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of array and enter the elements: ");
          int n=s.nextInt();int i,j,k;
          int a[]=new int[n];
          System.out.println("Enter the elements: ");
          for(i=0;i<n;i++)
                a[i]=s.nextInt();

          for(i=0;i<n;i++)
        {         for(j=i+1; j<n; j++)
                        { if(a[i] == a[j])
                                { for(k=j; k < n - 1; k++)
                                        { a[k] = a[k + 1];
                                        }
                                n--;
                                j--;
                                }
                        }
        }
System.out.print("Array without duplicates: ");
 for(i=0; i<n; i++)
 { System.out.print(a[i]+" ");
 }
}
}
```

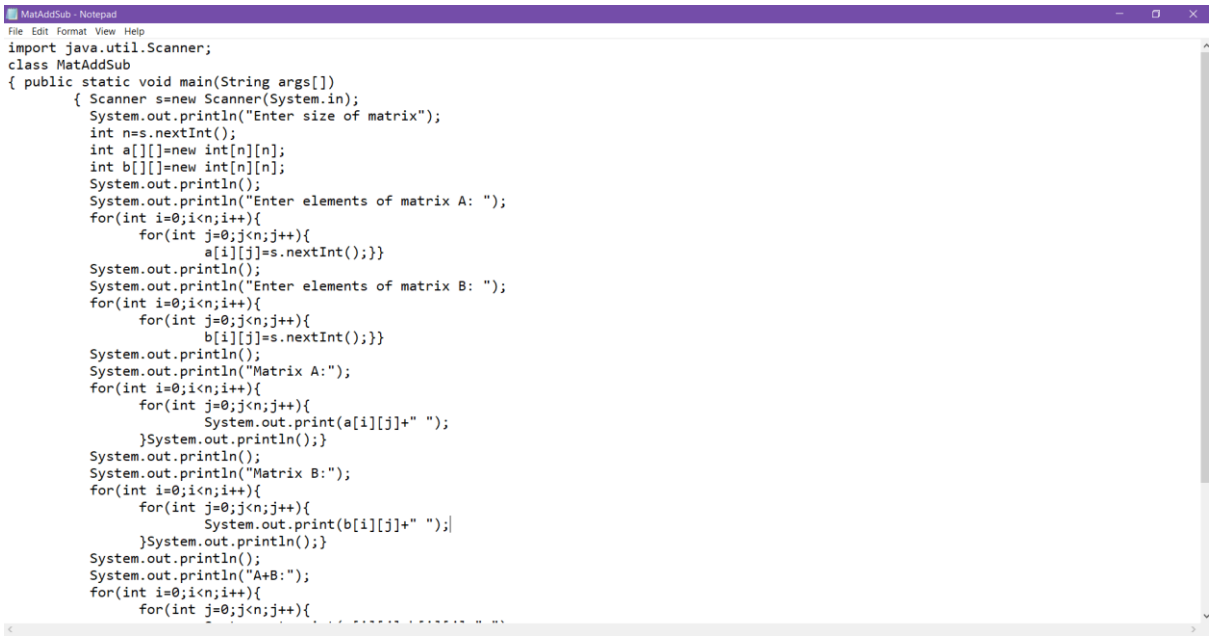
OUTPUT:

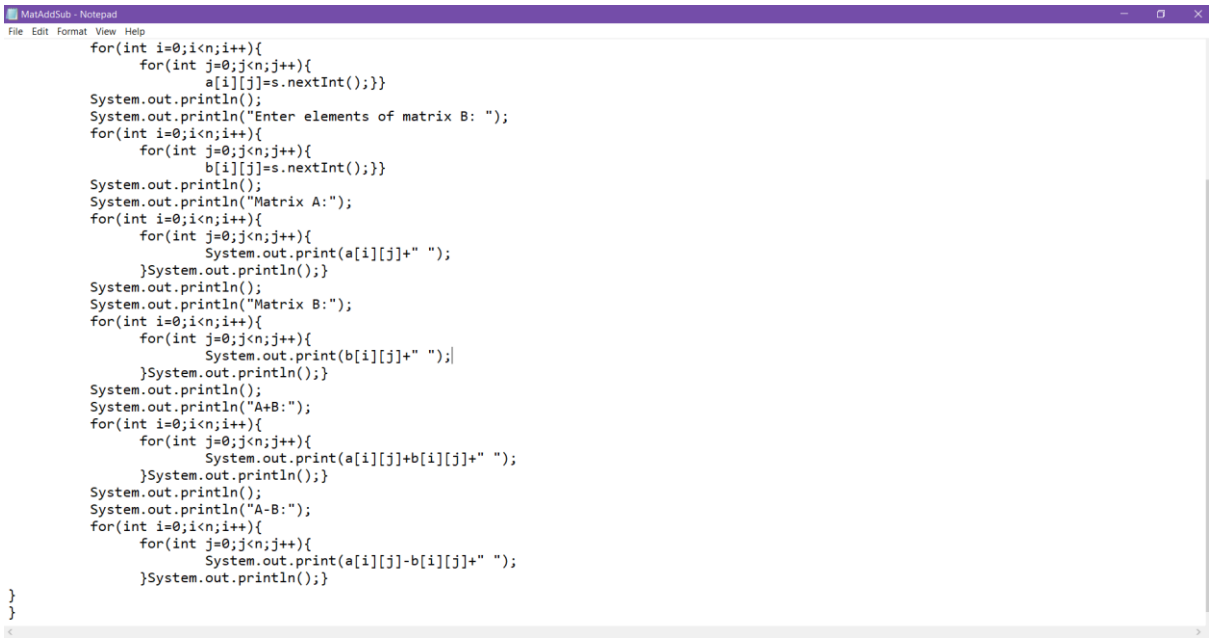
C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac MultiEntry.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java MultiEntry
Enter size of array:
5
Enter the elements:
65
54
12
03
84
Array without duplicates: 65 54 12 3 84
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java MultiEntry
Enter size of array:
6
Enter the elements:
4
4
5
8
4
12
Array without duplicates: 4 5 8 12
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```

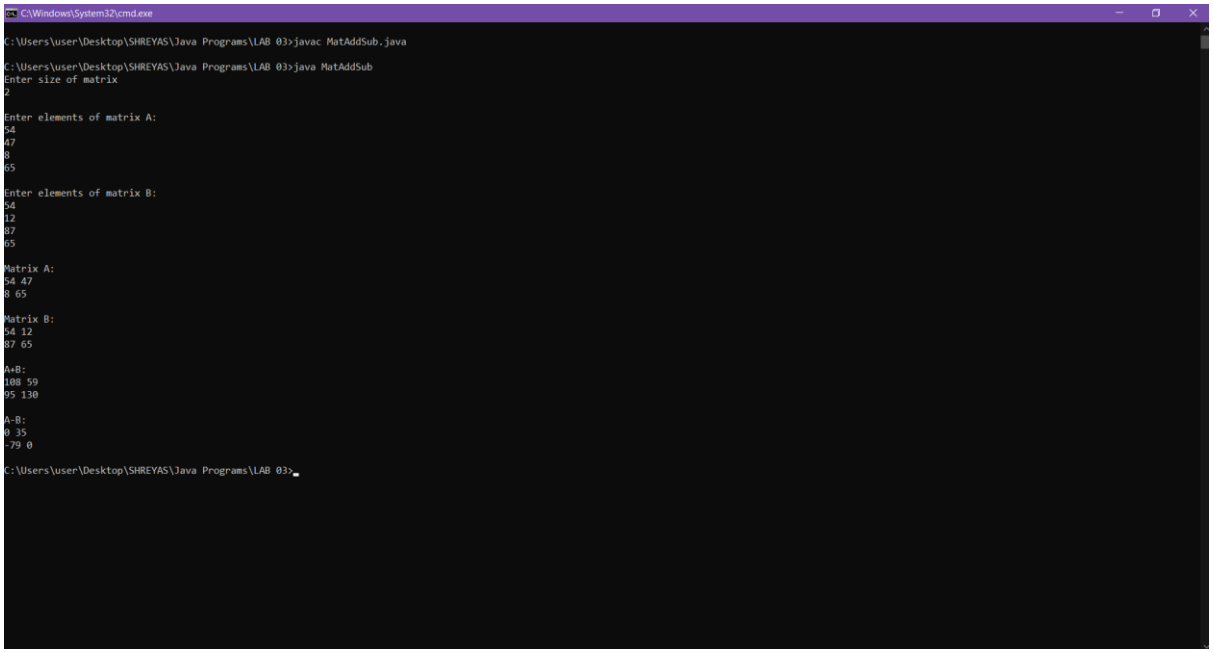
2-D Array

Q.1 Write a program to perform Matrix addition and subtraction
CODE:





OUTPUT:


C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac MatAddSub.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java MatAddSub
Enter size of matrix
2
Enter elements of matrix A:
54
47
8
65
Enter elements of matrix B:
54
12
87
65
Matrix A:
54 47
8 65
Matrix B:
54 12
87 65
A+B:
108 59
95 130
A-B:
0 35
-79 0
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>

Q.2. Write a program to perform Matrix multiplication

CODE:

MatMulti - Notepad

File Edit Format View Help

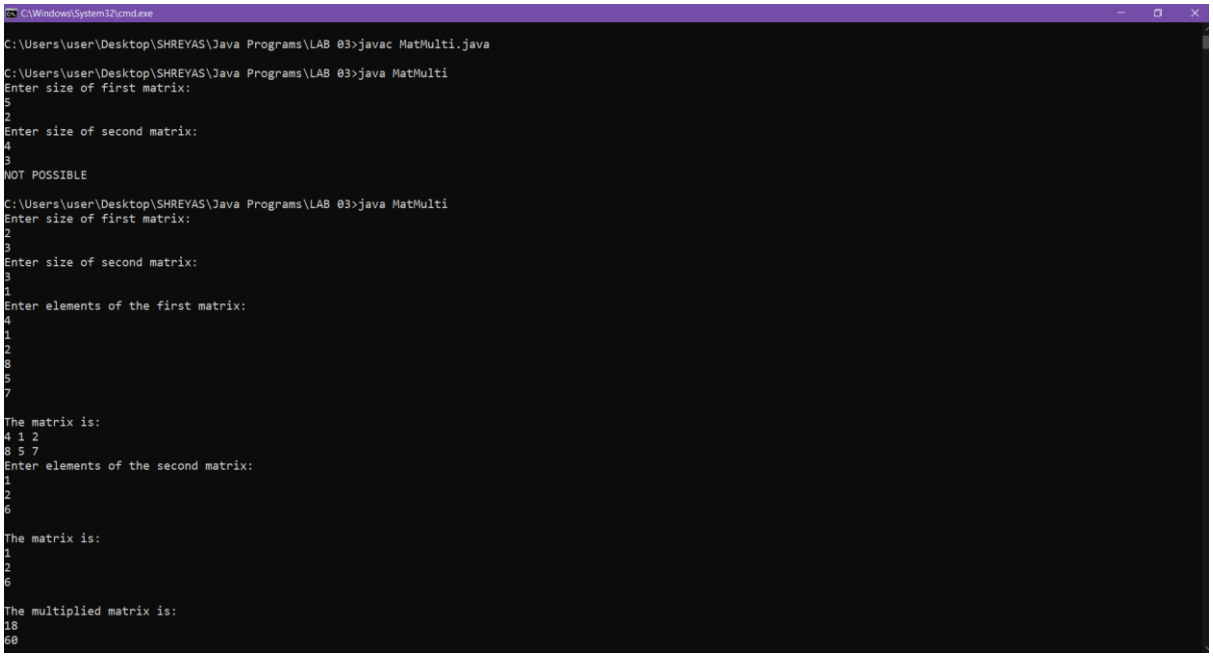
```
import java.util.Scanner;
class MatMulti
{ public static void main(String args[])
{ Scanner s=new Scanner(System.in);
System.out.println("Enter size of first matrix: ");
int m1=s.nextInt();
int n1=s.nextInt();
int a[][]=new int[m1][n1];

System.out.println("Enter size of second matrix: ");
int m2=s.nextInt();
int n2=s.nextInt();
int b[][]=new int[m2][n2];

if(n1==m2)
{}
else
{System.out.println("NOT POSSIBLE");
return;}


System.out.println("Enter elements of the first matrix: ");

for(int i=0;i<m1;i++){
         for(int j=0;j<n1;j++){
                  a[i][j]=s.nextInt();}}
System.out.println("\nThe matrix is: ");
for(int i=0;i<m1;i++){
         for(int j=0;j<n1;j++){
                  System.out.print(a[i][j]+" ");}
System.out.println();}
```

MatMulti - Notepad

File Edit Format View Help

```
         for(int j=0;j<n1;j++){
                  System.out.print(a[i][j]+" ");}
System.out.println();}



System.out.println("Enter elements of the second matrix: ");
for(int i=0;i<m2;i++)
         for(int j=0;j<n2;j++)
                  b[i][j]=s.nextInt();
System.out.println("\nThe matrix is: ");
for(int i=0;i<m2;i++){
         for(int j=0;j<n2;j++){
                  System.out.print(b[i][j]+" ");}
System.out.println();}



int c[][]=new int[m1][n2];

 for (int i = 0; i < m1; i++) {
            for (int j = 0; j < n2; j++) {
                for (int k = 0; k < m2; k++)
                    c[i][j] += a[i][k] * b[k][j];
            }
        }
System.out.println("\nThe multiplied matrix is: ");
for(int i=0;i<m1;i++){
         for(int j=0;j<n2;j++){
                  System.out.print(c[i][j]+" ");}
System.out.println();}

}
}
```

OUTPUT:


C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac MatMulti.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java MatMulti
Enter size of first matrix:
5
2
Enter size of second matrix:
4
3
NOT POSSIBLE
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java MatMulti
Enter size of first matrix:
2
3
Enter size of second matrix:
3
1
Enter elements of the first matrix:
4
1
2
8
5
7
The matrix is:
4 1 2
8 5 7
Enter elements of the second matrix:
1
2
6
The matrix is:
1
2
6
The multiplied matrix is:
18
60

Q.3. Write a program to check if the given Matrix is symmetric or not
CODE:

SymMat - Notepad

File Edit Format View Help

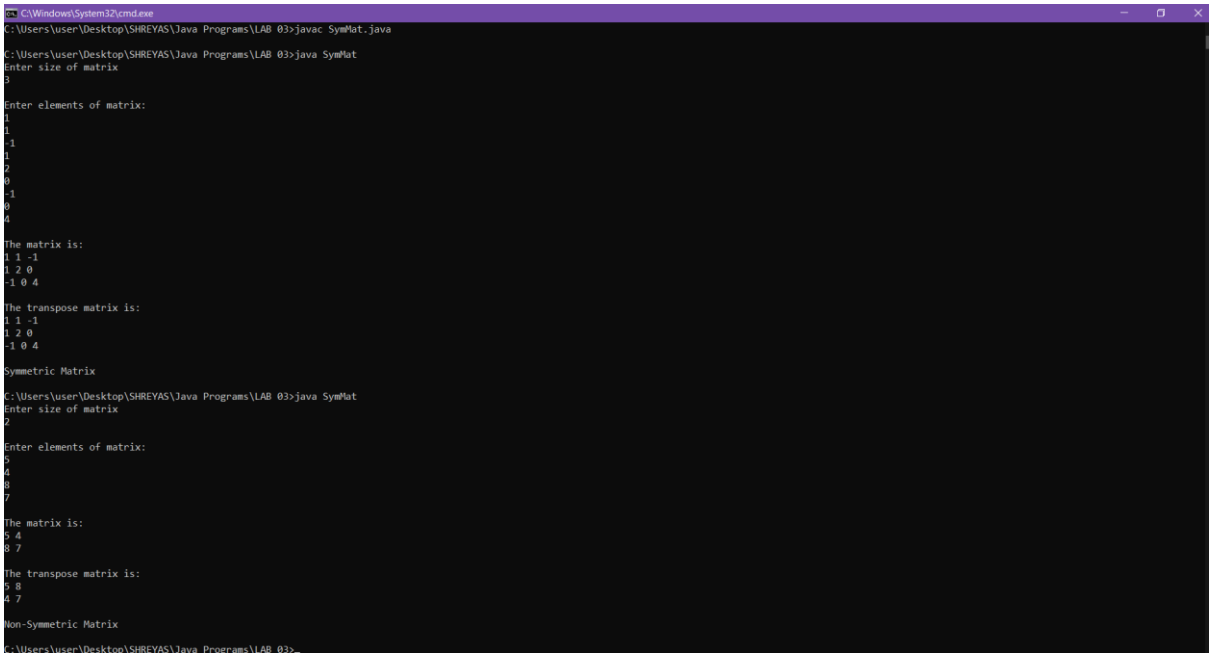
```
import java.util.Scanner;
class SymMat
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of matrix");
          int m=s.nextInt();

          int a[][]=new int[m][m];
          System.out.println("\nEnter elements of matrix: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        a[i][j]=s.nextInt();}}

          System.out.println("\nThe matrix is: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        System.out.print(a[i][j]+" ");
                }System.out.println();}

          int b[][]=new int[m][m];
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        b[i][j]=a[j][i];
                }}
          int k=0;

          System.out.println("\nThe transpose matrix is: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        System.out.print(b[i][j]+" ");
                }System.out.println();}


          for(int i=0;i<m;i++){
```

SymMat - Notepad

File Edit Format View Help

```
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        System.out.print(a[i][j]+" ");
                }System.out.println();}

          int b[][]=new int[m][m];
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        b[i][j]=a[j][i];
                }}
          int k=0;

          System.out.println("\nThe transpose matrix is: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        System.out.print(b[i][j]+" ");
                }System.out.println();}


          for(int i=0;i<m;i++){
                for(int j=0;j<m;j++){
                        if(a[i][j]==a[j][i])
                          k=1;
                        else
                        {k=0;break;} }}
          if (k==1)
          System.out.println("\nSymmetric Matrix");
          else
          System.out.println("\nNon-Symmetric Matrix");
}}
```

OUTPUT:


C:\Windows\System32\cmd.exe
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac SymMat.java
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java SymMat
Enter size of matrix
3
Enter elements of matrix:
1
1
-1
1
2
0
-1
0
4
The matrix is:
1 1 -1
1 2 0
-1 0 4
The transpose matrix is:
1 1 -1
1 2 0
-1 0 4
Symmetric Matrix
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java SymMat
Enter size of matrix
2
Enter elements of matrix:
5
4
8
7
The matrix is:
5 4
8 7
The transpose matrix is:
5 8
4 7
Non-Symmetric Matrix
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>

Q.4. Write a program to find the transpose of a given Matrix

CODE:

TransposeMat - Notepad

File Edit Format View Help

```
import java.util.Scanner;
class TransposeMat
{ public static void main(String args[])
        { Scanner s=new Scanner(System.in);
          System.out.println("Enter size of matrix");
          int m=s.nextInt();
          int n=s.nextInt();
          int a[][]=new int[m][n];
          System.out.println("\nEnter elements of matrix: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<n;j++){
                        a[i][j]=s.nextInt();}}

          System.out.println("\nThe matrix is: ");
          for(int i=0;i<m;i++){
                for(int j=0;j<n;j++){
                        System.out.print(a[i][j]+" ");
                }System.out.println();}

          int b[][]=new int[n][m];
          for(int i=0;i<n;i++){
                for(int j=0;j<m;j++){
                        b[i][j]=a[j][i];
                }}

          System.out.println("\nThe transpose matrix is: ");
          for(int i=0;i<n;i++){
                for(int j=0;j<m;j++){
                        System.out.print(b[i][j]+" ");
                }System.out.println();}
}
}
```

OUTPUT:

C:\Windows\System32\cmd.exe

```
C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>javac TransposeMat.java

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>java TransposeMat
Enter size of matrix
2
3

Enter elements of matrix:
5
4
8
7
6
9

The matrix is:
5 4 8
7 6 9

The transpose matrix is:
5 7
4 6
8 9

C:\Users\user\Desktop\SHREYAS\Java Programs\LAB 03>
```