Assignment No:-34

Name:-Suryawanshi Sangramsingh Sambhaji

Batch: - Delta - DCA (Java) 2024 Date:-23/6/2024

1. Write a Java program to add two matrices of the same size.

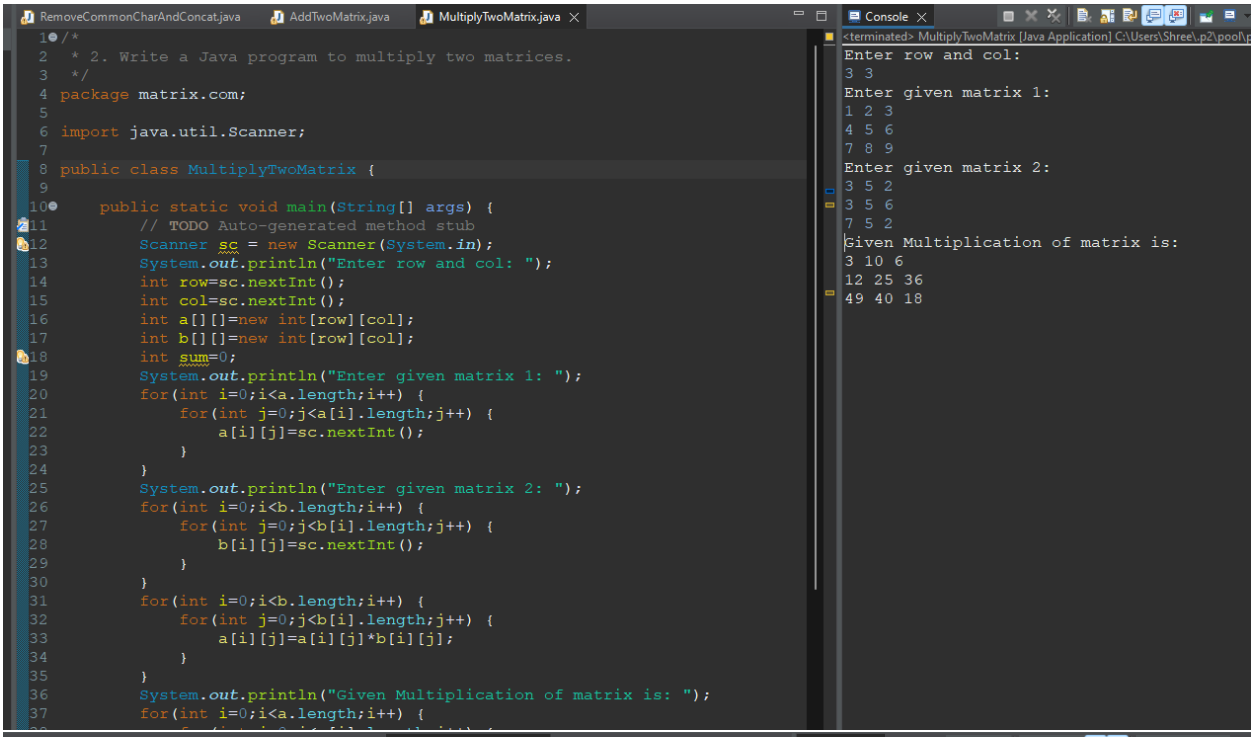
RemoveCommonCharAndConcat.java | AddTwoMatrix.java

```java
/*
 * 1. Write a Java program to add two matrices of the same size.
 */
package matrix.com;

import java.util.Scanner;

public class AddTwoMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        int b[][]=new int[row][col];
        int sum=0;
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Enter given matrix 2: ");
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                b[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                a[i][j]=a[i][j]+b[i][j];
            }
        }
        System.out.println("Given matrix is: ");
        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();
        }
    }

}
```

Console

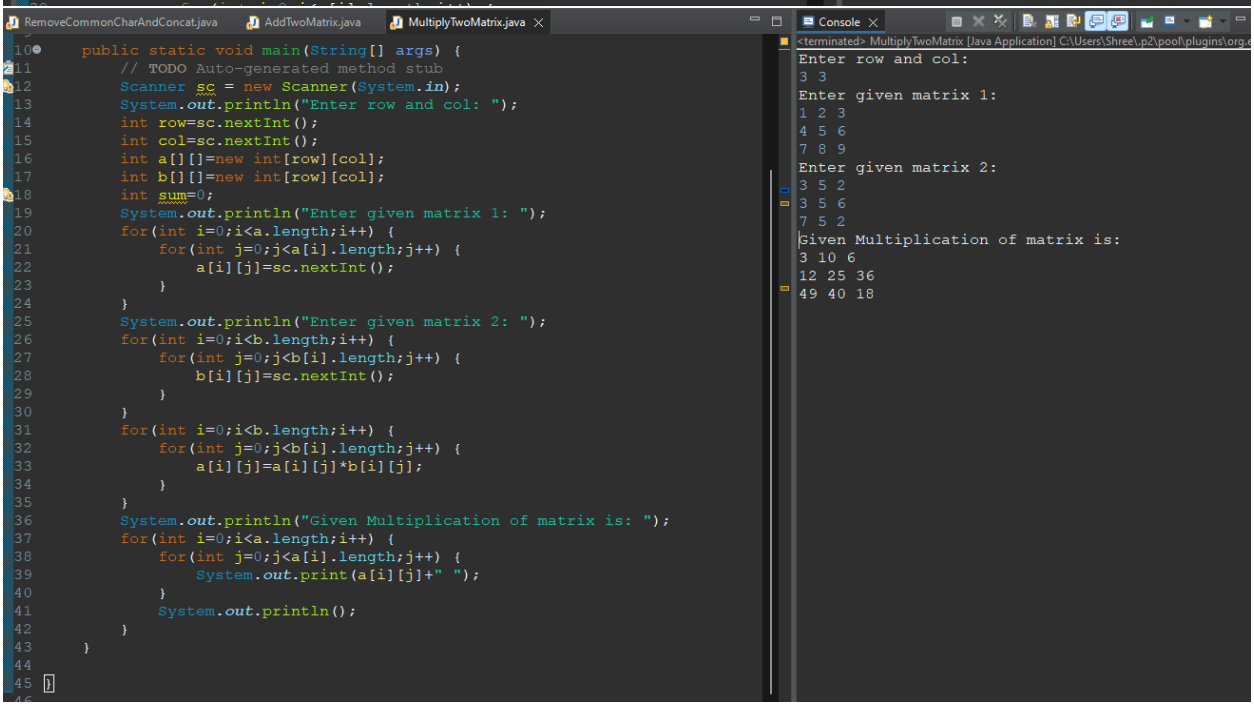
```
<terminated> AddTwoMatrix [Java Application] C:\Users\Shree\.p2\pool\plugins\org.e
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Enter given matrix 2:
1 2 3
4 5 6
7 8 9
Given matrix is:
2 4 6
8 10 12
14 16 18
```

2. Write a Java program to multiply two matrices.



```java
/*
 * 2. Write a Java program to multiply two matrices.
 */
package matrix.com;

import java.util.Scanner;

public class MultiplyTwoMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        int b[][]=new int[row][col];
        int sum=0;
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Enter given matrix 2: ");
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                b[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                a[i][j]=a[i][j]*b[i][j];
            }
        }
        System.out.println("Given Multiplication of matrix is: ");
        for(int i=0;i<a.length;i++) {
```

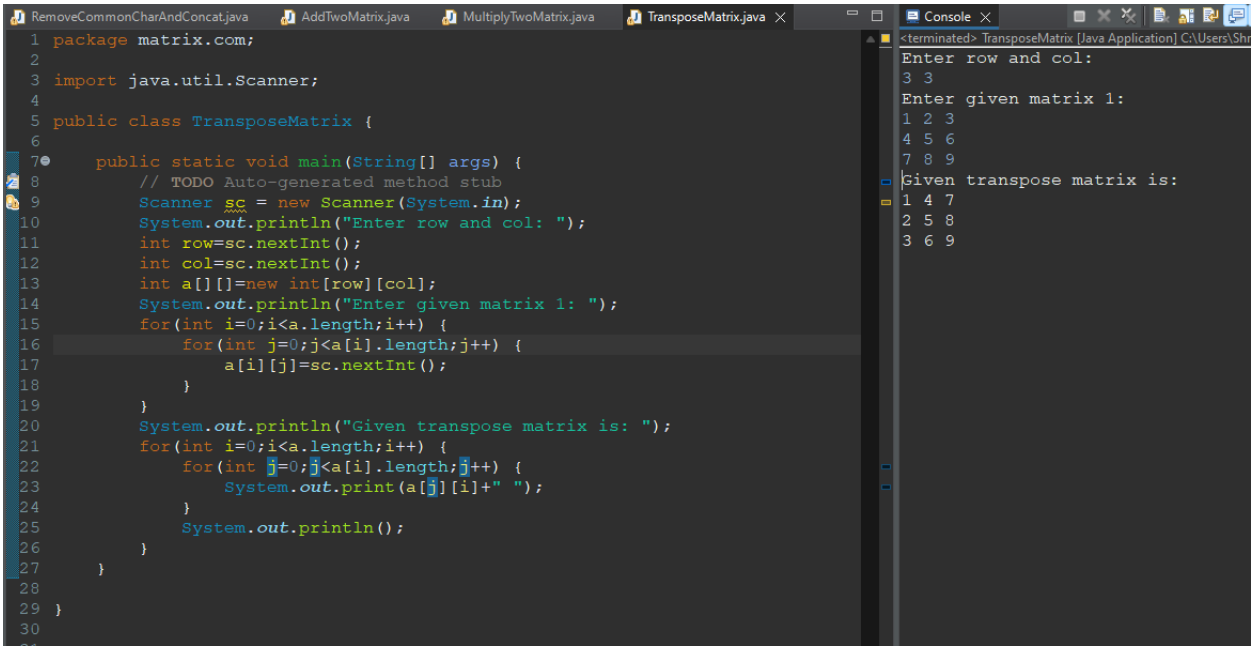
```
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Enter given matrix 2:
3 5 2
3 5 6
7 5 2
Given Multiplication of matrix is:
3 10 6
12 25 36
49 40 18
```



```java
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        int b[][]=new int[row][col];
        int sum=0;
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Enter given matrix 2: ");
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                b[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<b.length;i++) {
            for(int j=0;j<b[i].length;j++) {
                a[i][j]=a[i][j]*b[i][j];
            }
        }
        System.out.println("Given Multiplication of matrix is: ");
        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();
        }
    }

}
```

```
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Enter given matrix 2:
3 5 2
3 5 6
7 5 2
Given Multiplication of matrix is:
3 10 6
12 25 36
49 40 18
```

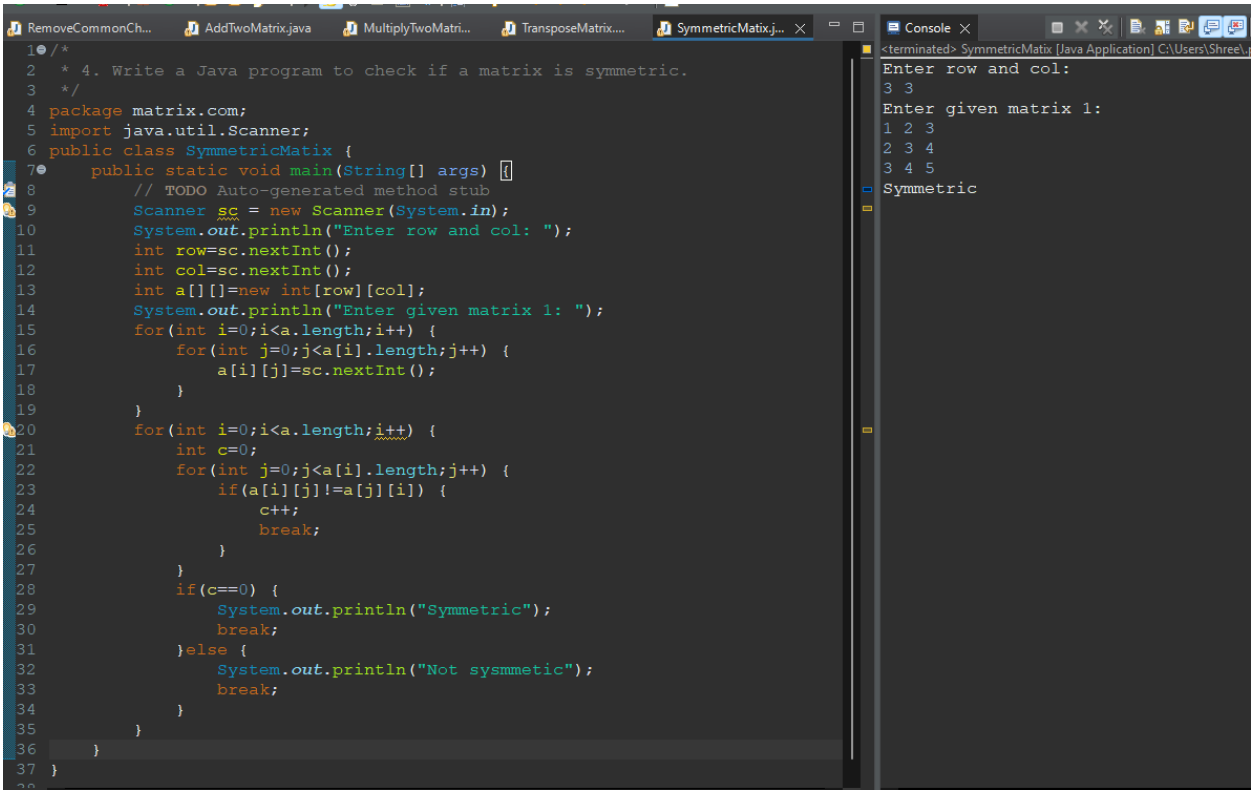
3. Write a Java program to find the transpose of a matrix.



```
RemoveCommonCharAndConcat.java  AddTwoMatrix.java  MultiplyTwoMatrix.java  TransposeMatrix.java
 1 package matrix.com;
 2
 3 import java.util.Scanner;
 4
 5 public class TransposeMatrix {
 6
 7     public static void main(String[] args) {
 8         // TODO Auto-generated method stub
 9         Scanner sc = new Scanner(System.in);
10         System.out.println("Enter row and col: ");
11         int row=sc.nextInt();
12         int col=sc.nextInt();
13         int a[][]=new int[row][col];
14         System.out.println("Enter given matrix 1: ");
15         for(int i=0;i<a.length;i++) {
16             for(int j=0;j<a[i].length;j++) {
17                 a[i][j]=sc.nextInt();
18             }
19         }
20         System.out.println("Given transpose matrix is: ");
21         for(int i=0;i<a.length;i++) {
22             for(int j=0;j<a[i].length;j++) {
23                 System.out.print(a[j][i]+" ");
24             }
25             System.out.println();
26         }
27     }
28
29 }
30
```

```
Console
<terminated> TransposeMatrix [Java Application] C:\Users\Shr
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Given transpose matrix is:
1 4 7
2 5 8
3 6 9
```

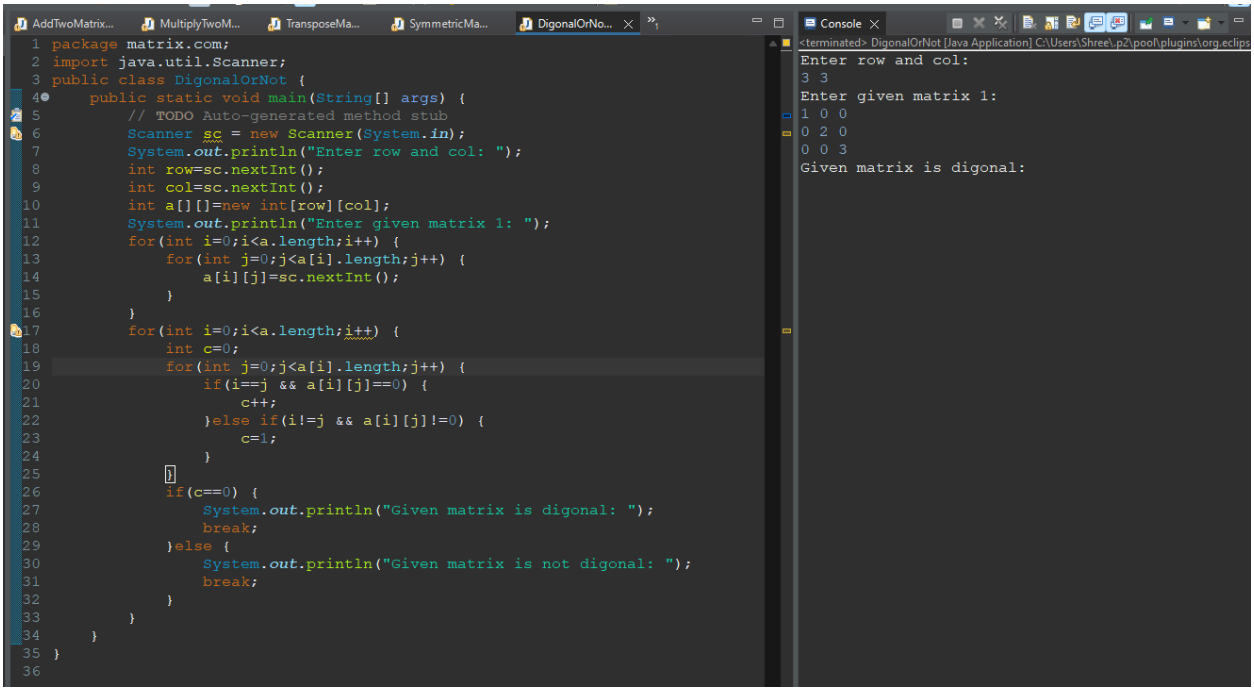
4. Write a Java program to check if a matrix is symmetric.



```
RemoveCommonCh...  AddTwoMatrix.java  MultiplyTwoMatri...  TransposeMatrix....  SymmetricMatix.j...
 1 /*
 2  * 4. Write a Java program to check if a matrix is symmetric.
 3  */
 4 package matrix.com;
 5 import java.util.Scanner;
 6 public class SymmetricMatix {
 7     public static void main(String[] args) {
 8         // TODO Auto-generated method stub
 9         Scanner sc = new Scanner(System.in);
10         System.out.println("Enter row and col: ");
11         int row=sc.nextInt();
12         int col=sc.nextInt();
13         int a[][]=new int[row][col];
14         System.out.println("Enter given matrix 1: ");
15         for(int i=0;i<a.length;i++) {
16             for(int j=0;j<a[i].length;j++) {
17                 a[i][j]=sc.nextInt();
18             }
19         }
20         for(int i=0;i<a.length;i++) {
21             int c=0;
22             for(int j=0;j<a[i].length;j++) {
23                 if(a[i][j]!=a[j][i]) {
24                     c++;
25                     break;
26                 }
27             }
28             if(c==0) {
29                 System.out.println("Symmetric");
30                 break;
31             }else {
32                 System.out.println("Not sysmmetic");
33                 break;
34             }
35         }
36     }
37 }
```

```
Console
<terminated> SymmetricMatix [Java Application] C:\Users\Shree\
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
2 3 4
3 4 5
Symmetric
```

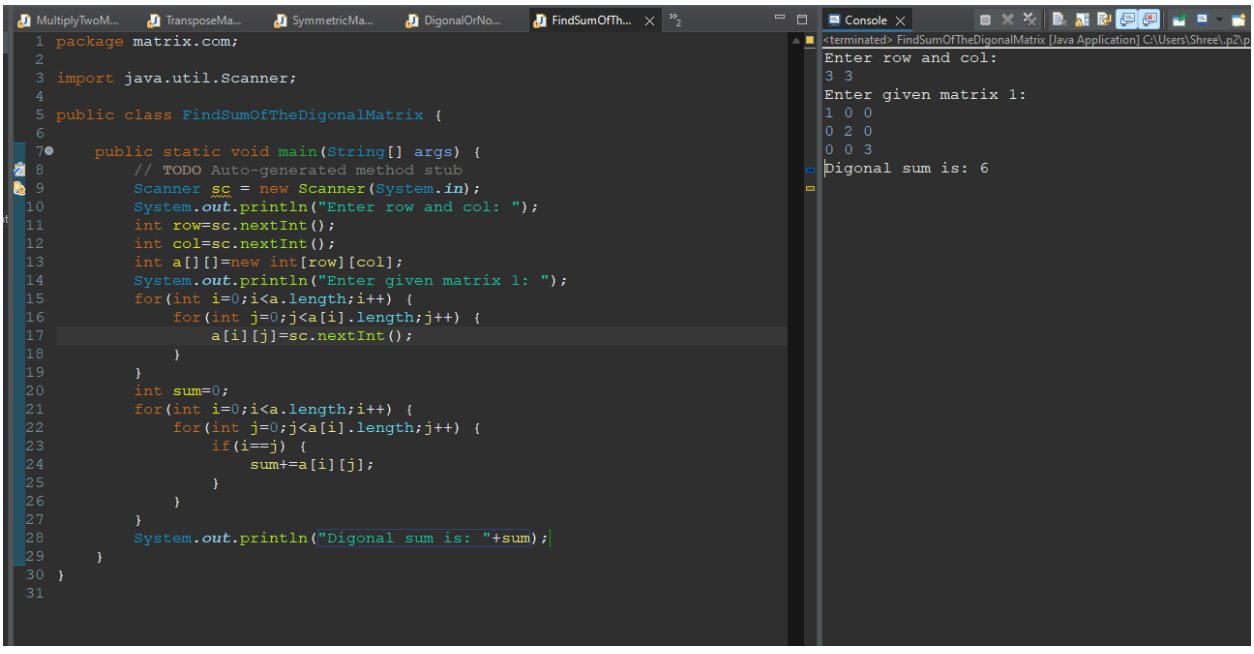
5. Write a Java program to check if a matrix is diagonal.



```
package matrix.com;
import java.util.Scanner;
public class DigonalOrNot {
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        for(int i=0;i<a.length;i++) {
            int c=0;
            for(int j=0;j<a[i].length;j++) {
                if(i==j && a[i][j]==0) {
                    c++;
                }else if(i!=j && a[i][j]!=0) {
                    c=1;
                }
            }
            if(c==0) {
                System.out.println("Given matrix is digonal: ");
                break;
            }else {
                System.out.println("Given matrix is not digonal: ");
                break;
            }
        }
    }
}
```

```
Enter row and col:
3 3
Enter given matrix 1:
1 0 0
0 2 0
0 0 3
Given matrix is digonal:
```

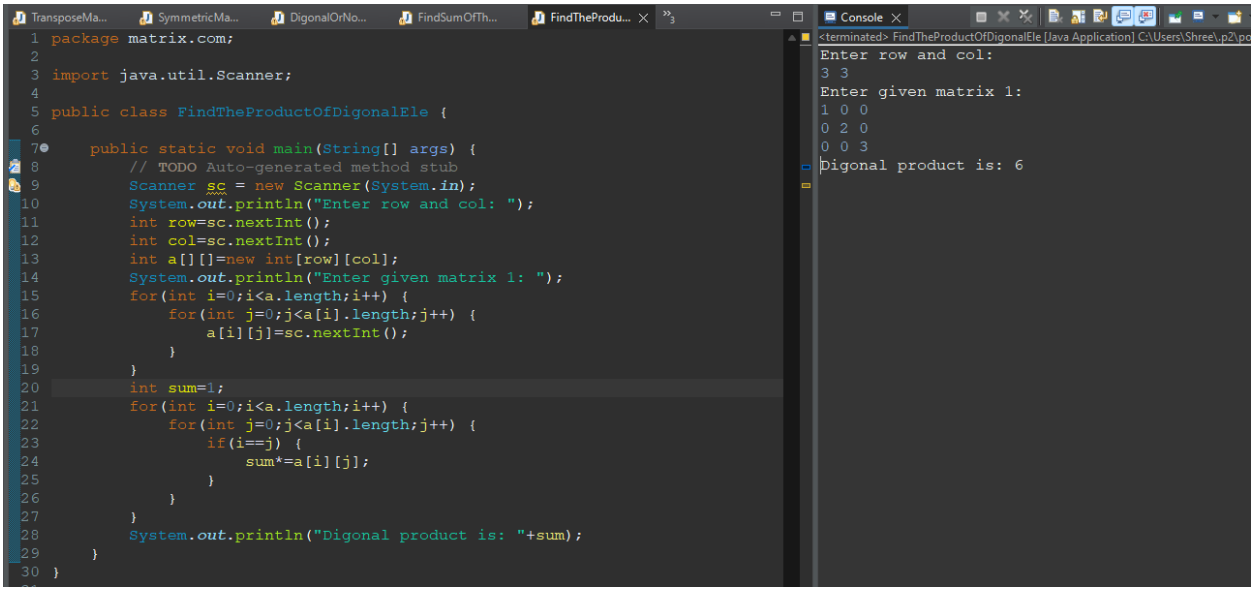
6. Write a Java program to find the sum of the diagonal elements of a matrix.



```
package matrix.com;

import java.util.Scanner;

public class FindSumOfTheDigonalMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        int sum=0;
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                if(i==j) {
                    sum+=a[i][j];
                }
            }
        }
        System.out.println("Digonal sum is: "+sum);
    }
}
```

```
Enter row and col:
3 3
Enter given matrix 1:
1 0 0
0 2 0
0 0 3
Digonal sum is: 6
```

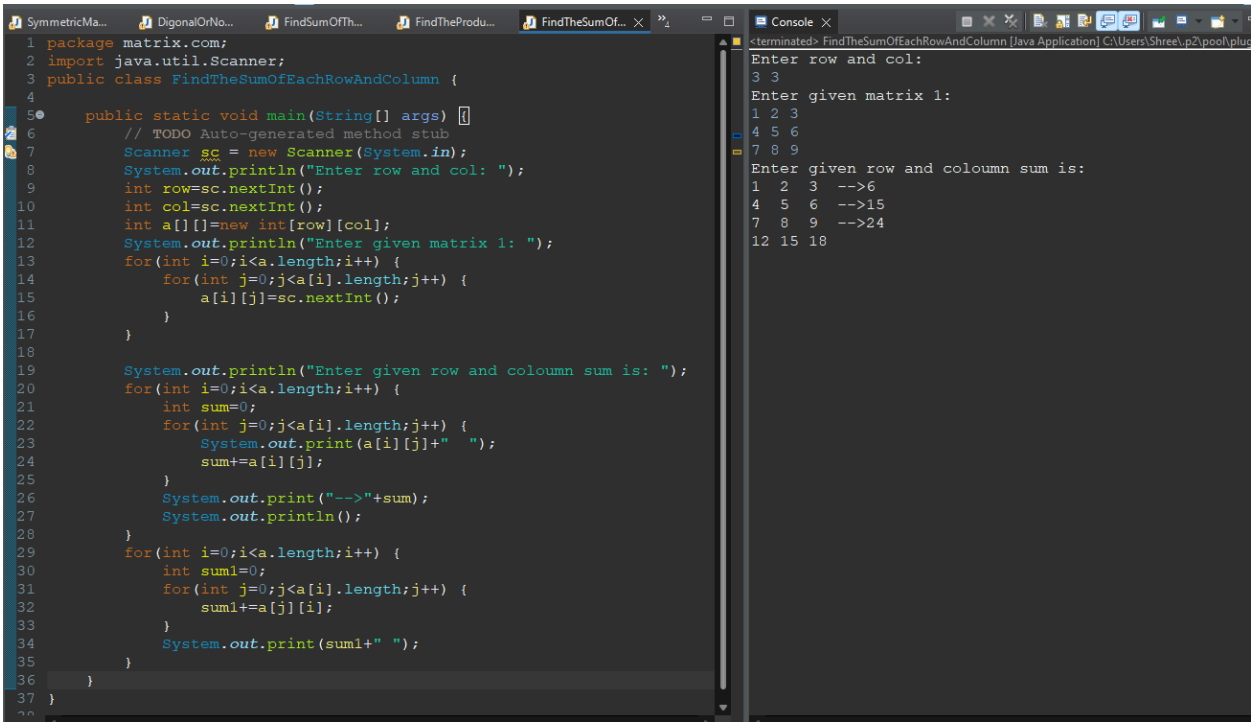
7. Write a Java program to find the product of diagonal elements of a matrix.



```
package matrix.com;

import java.util.Scanner;

public class FindTheProductOfDigonalEle {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        int sum=1;
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                if(i==j) {
                    sum*=a[i][j];
                }
            }
        }
        System.out.println("Digonal product is: "+sum);
    }
}
```

```
<terminated> FindTheProductOfDigonalEle [Java Application] C:\Users\Shree\.p2\po
Enter row and col:
3 3
Enter given matrix 1:
1 0 0
0 2 0
0 0 3
Digonal product is: 6
```

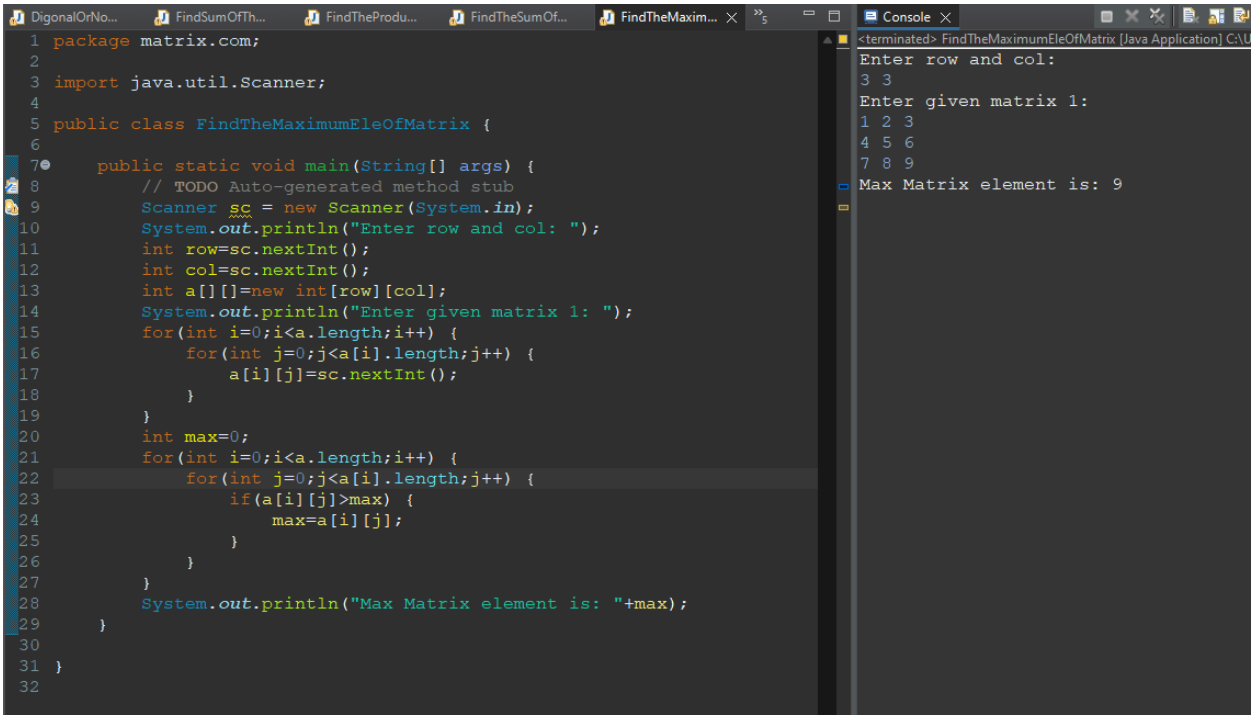
8. Write a Java program to find the sum of each row and column of a matrix.



```
package matrix.com;
import java.util.Scanner;
public class FindTheSumOfEachRowAndColumn {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }

        System.out.println("Enter given row and coloumn sum is: ");
        for(int i=0;i<a.length;i++) {
            int sum=0;
            for(int j=0;j<a[i].length;j++) {
                System.out.print(a[i][j]+"  ");
                sum+=a[i][j];
            }
            System.out.print("-->"+sum);
            System.out.println();
        }
        for(int i=0;i<a.length;i++) {
            int sum1=0;
            for(int j=0;j<a[i].length;j++) {
                sum1+=a[j][i];
            }
            System.out.print(sum1+" ");
        }
    }
}
```

```
<terminated> FindTheSumOfEachRowAndColumn [Java Application] C:\Users\Shree\.p2\pool\plug
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Enter given row and coloumn sum is:
1  2  3  -->6
4  5  6  -->15
7  8  9  -->24
12 15 18
```

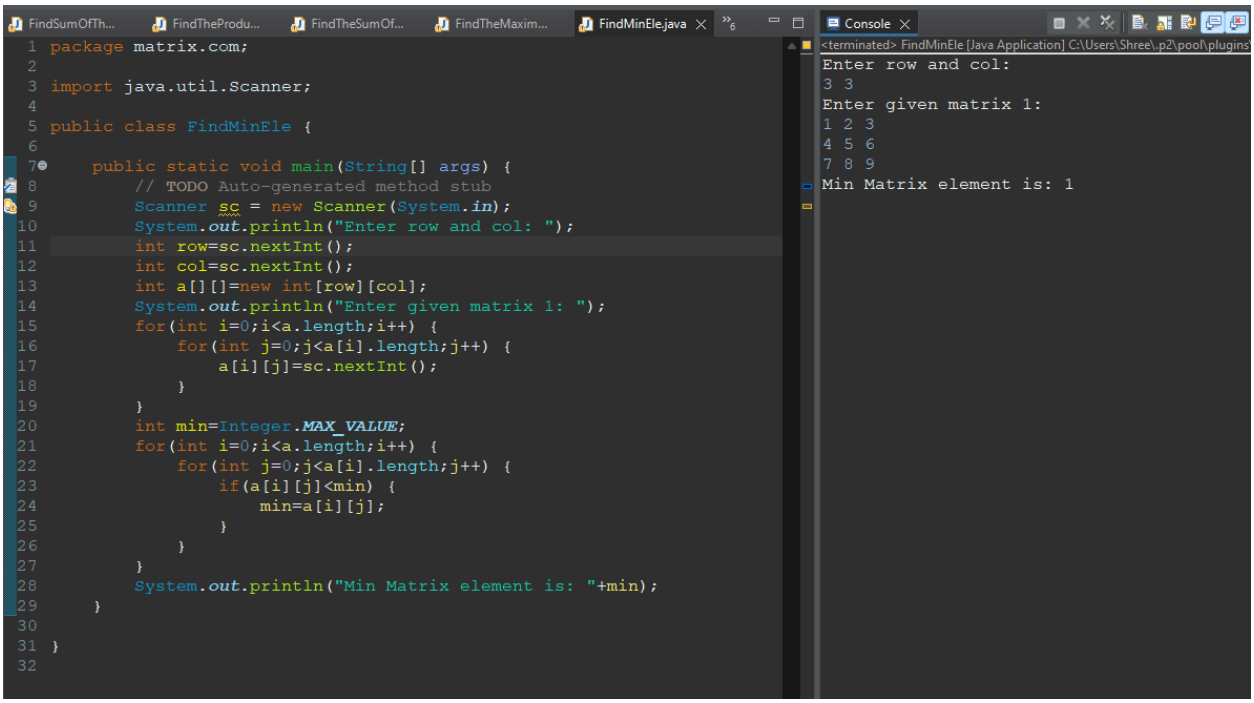
9. Write a Java program to find the maximum element in a matrix.



```java
package matrix.com;

import java.util.Scanner;

public class FindTheMaximumEleOfMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        int max=0;
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                if(a[i][j]>max) {
                    max=a[i][j];
                }
            }
        }
        System.out.println("Max Matrix element is: "+max);
    }

}
```

```
<terminated> FindTheMaximumEleOfMatrix [Java Application] C:\U
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Max Matrix element is: 9
```

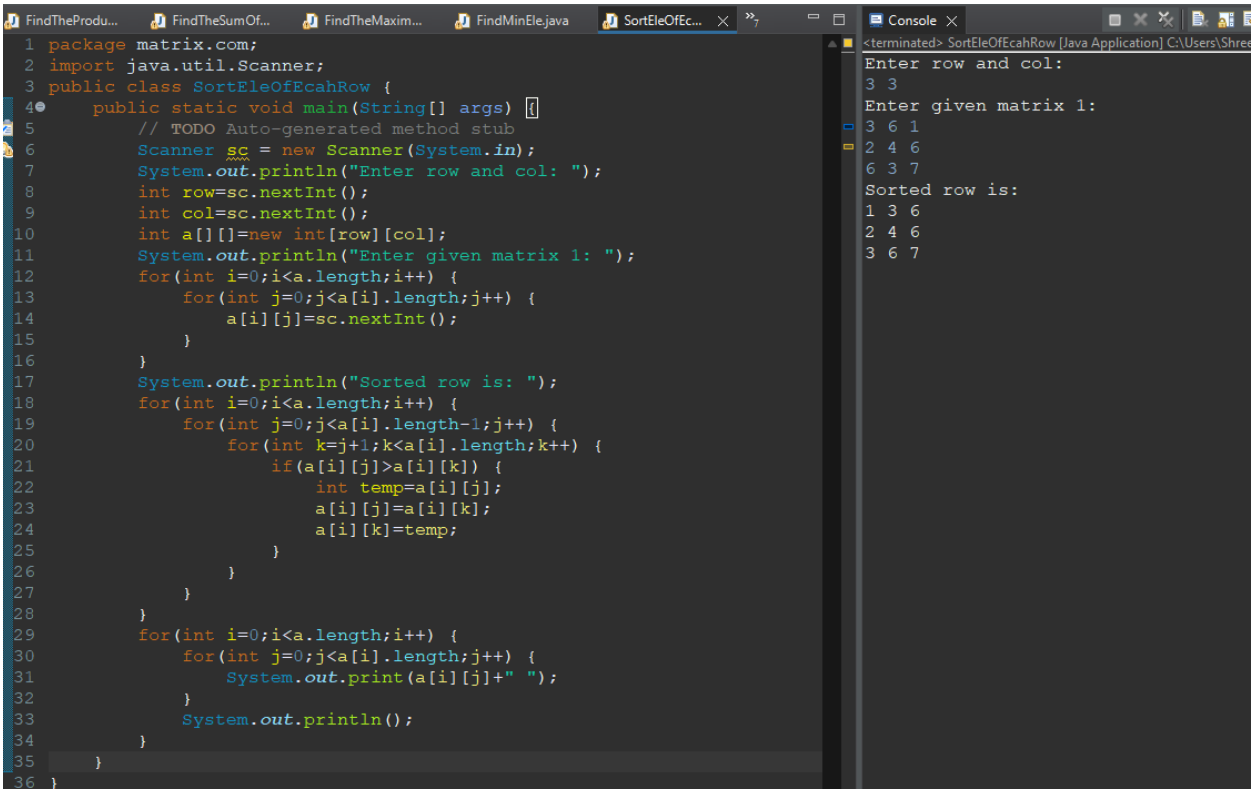
10. Write a Java program to find the minimum element in a matrix.



```java
package matrix.com;

import java.util.Scanner;

public class FindMinEle {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        int min=Integer.MAX_VALUE;
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                if(a[i][j]<min) {
                    min=a[i][j];
                }
            }
        }
        System.out.println("Min Matrix element is: "+min);
    }

}
```

```
<terminated> FindMinEle [Java Application] C:\Users\Shree\.p2\pool\plugins
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Min Matrix element is: 1
```

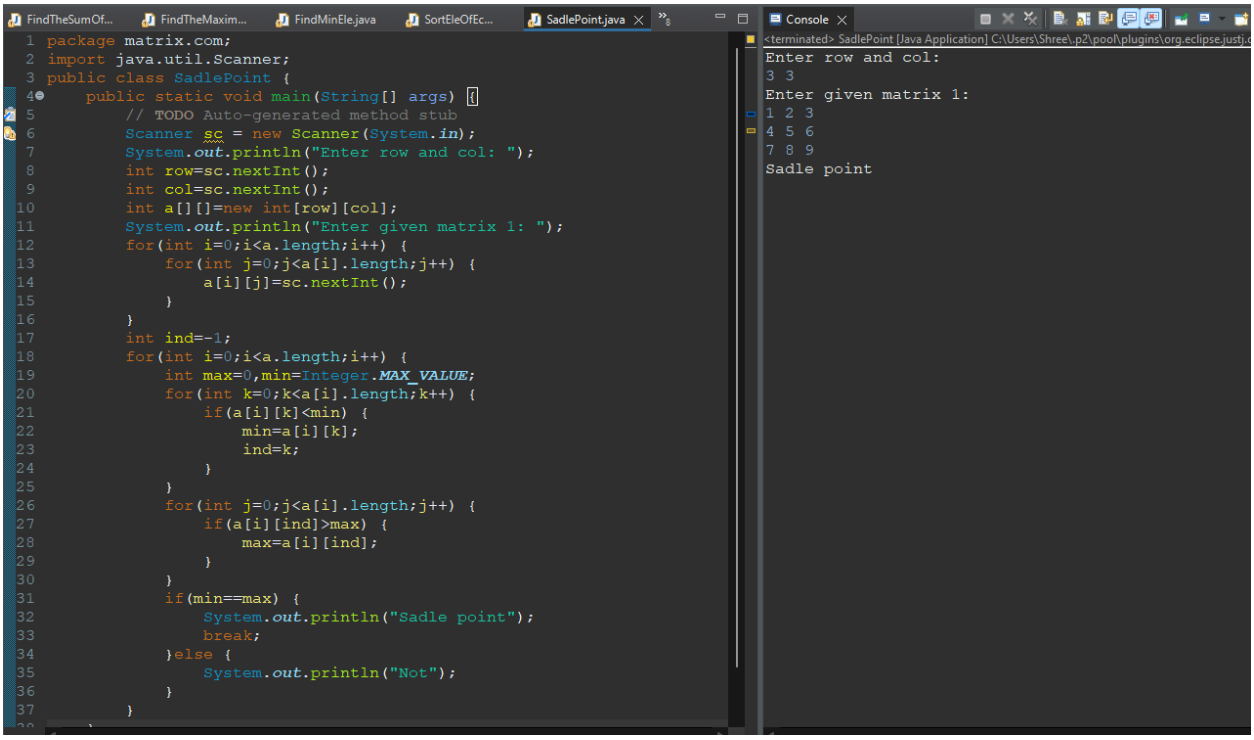
11. Write a Java program to sort the elements of each row of a matrix.



```
package matrix.com;
import java.util.Scanner;
public class SortEleOfEcahRow {
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Sorted row is: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length-1;j++) {
                for(int k=j+1;k<a[i].length;k++) {
                    if(a[i][j]>a[i][k]) {
                        int temp=a[i][j];
                        a[i][j]=a[i][k];
                        a[i][k]=temp;
                    }
                }
            }
        }
        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();
        }
    }
}
```

```
Enter row and col:
3 3
Enter given matrix 1:
3 6 1
2 4 6
6 3 7
Sorted row is:
1 3 6
2 4 6
3 6 7
```

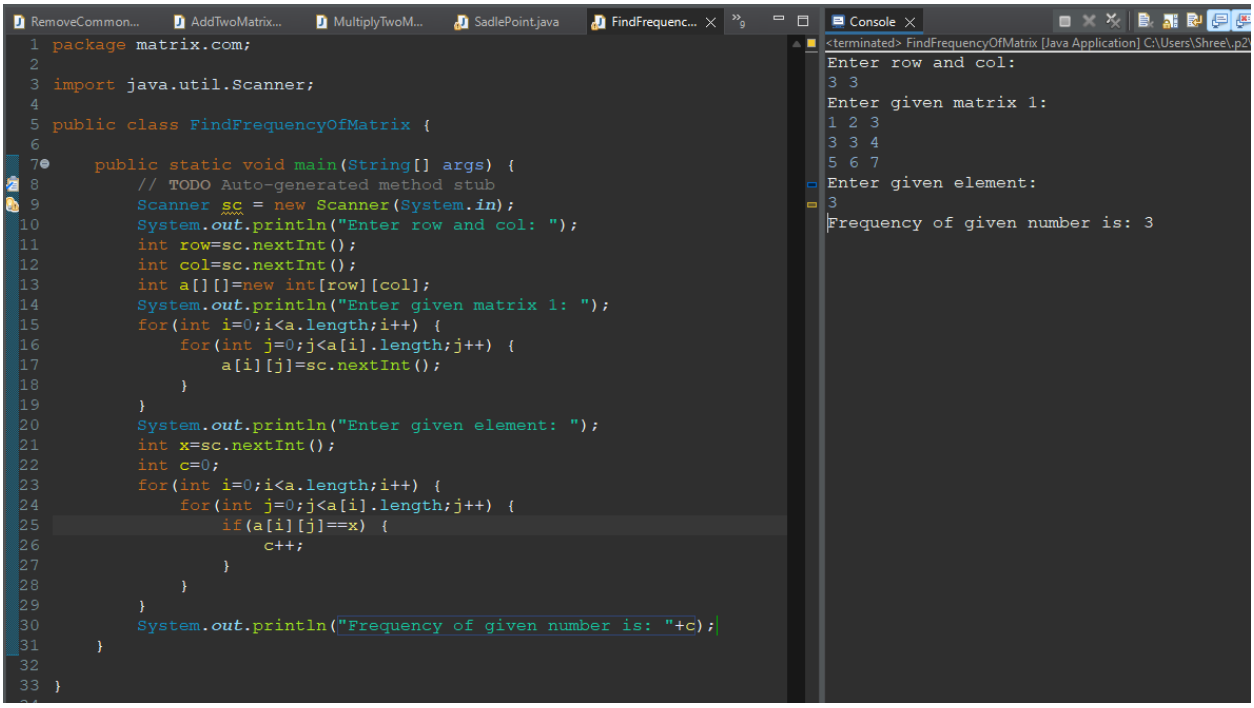
12. Write a Java program to find the saddle point of a matrix.



```
package matrix.com;
import java.util.Scanner;
public class SadlePoint {
    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        int ind=-1;
        for(int i=0;i<a.length;i++) {
            int max=0,min=Integer.MAX_VALUE;
            for(int k=0;k<a[i].length;k++) {
                if(a[i][k]<min) {
                    min=a[i][k];
                    ind=k;
                }
            }
            for(int j=0;j<a[i].length;j++) {
                if(a[i][ind]>max) {
                    max=a[i][ind];
                }
            }
            if(min==max) {
                System.out.println("Sadle point");
                break;
            }else {
                System.out.println("Not");
            }
        }
```

```
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Sadle point
```

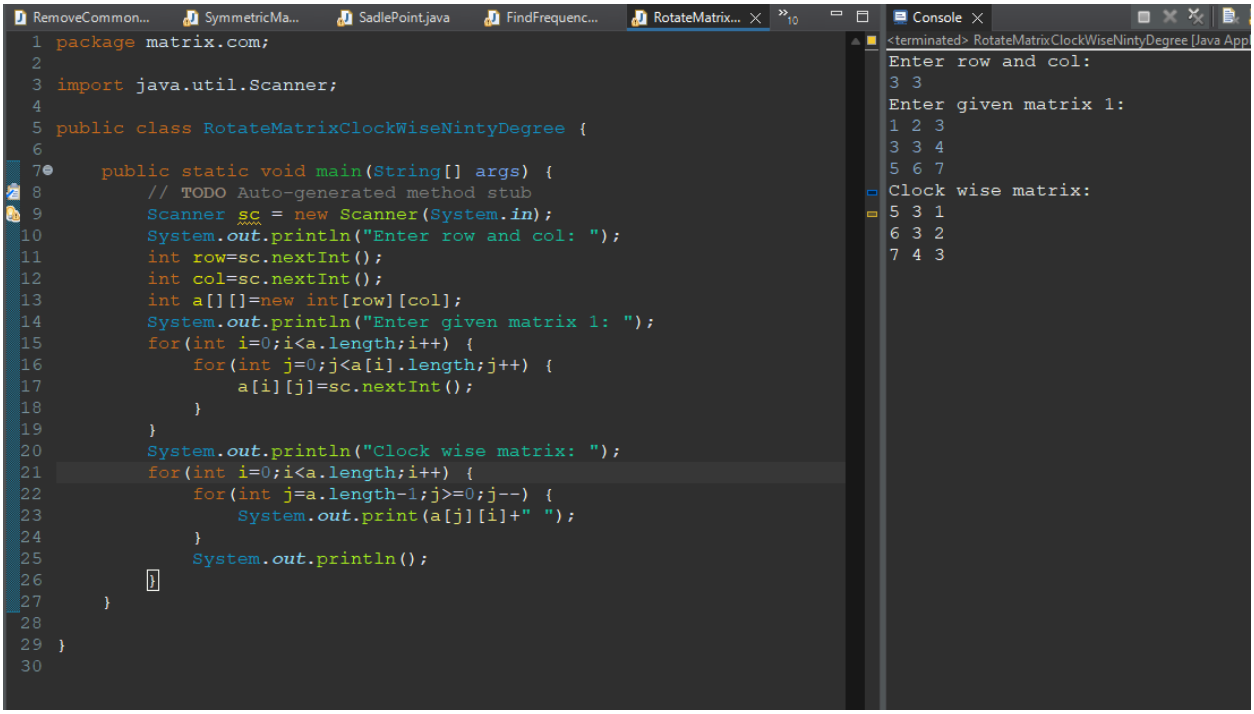
13. Write a Java program to find the frequency of a given element in a matrix.



```
package matrix.com;

import java.util.Scanner;

public class FindFrequencyOfMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Enter given element: ");
        int x=sc.nextInt();
        int c=0;
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                if(a[i][j]==x) {
                    c++;
                }
            }
        }
        System.out.println("Frequency of given number is: "+c);
    }

}
```

```
<terminated> FindFrequencyOfMatrix [Java Application] C:\Users\Shree\.p2\
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
3 3 4
5 6 7
Enter given element:
3
Frequency of given number is: 3
```

14. Write a Java program to rotate a matrix by 90 degrees clockwise.



```
package matrix.com;

import java.util.Scanner;

public class RotateMatrixClockWiseNintyDegree {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
            }
        }
        System.out.println("Clock wise matrix: ");
        for(int i=0;i<a.length;i++) {
            for(int j=a.length-1;j>=0;j--) {
                System.out.print(a[j][i]+" ");
            }
            System.out.println();
        }
    }

}
```

```
<terminated> RotateMatrixClockWiseNintyDegree [Java App
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
3 3 4
5 6 7
Clock wise matrix:
5 3 1
6 3 2
7 4 3
```

1: Implement a function to rotate a square matrix (2D array) by 90 degrees in clockwise direction.

Example:

Input:

[[1, 2, 3],

[4, 5, 6],

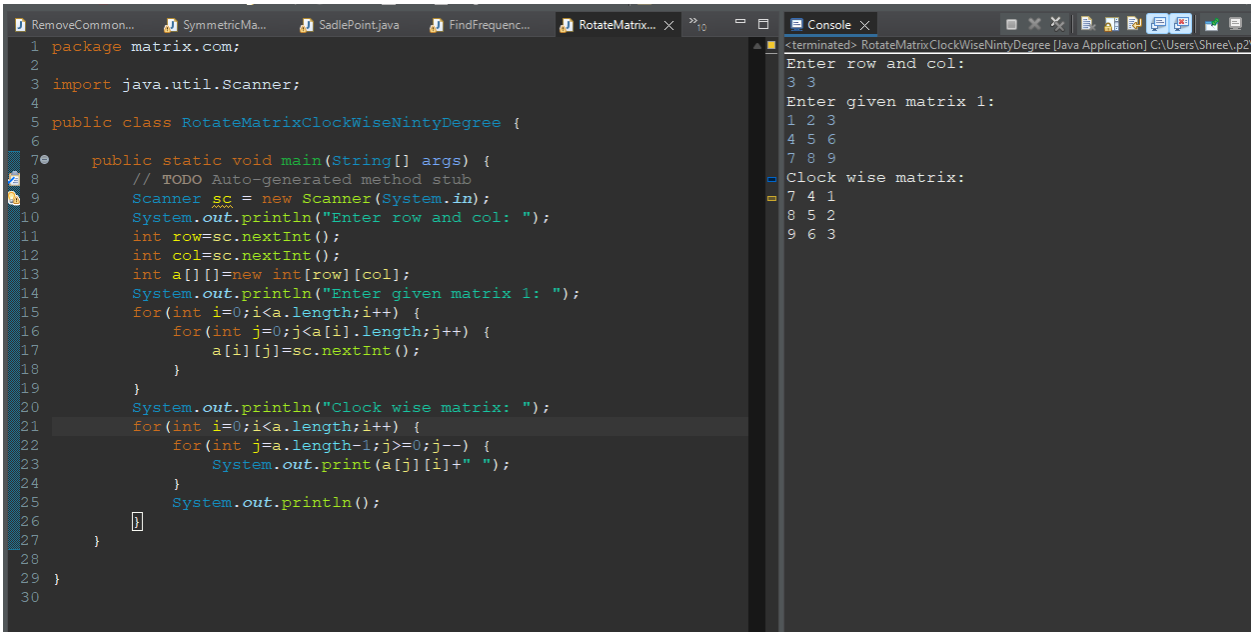
[7, 8, 9]]

Output:

[[7, 4, 1],

[8, 5, 2],

[9, 6, 3]]



2: Given a matrix of integers, write a function to find the median of the matrix. The matrix is sorted in non-decreasing order both row-wise and column-wise.

Example:

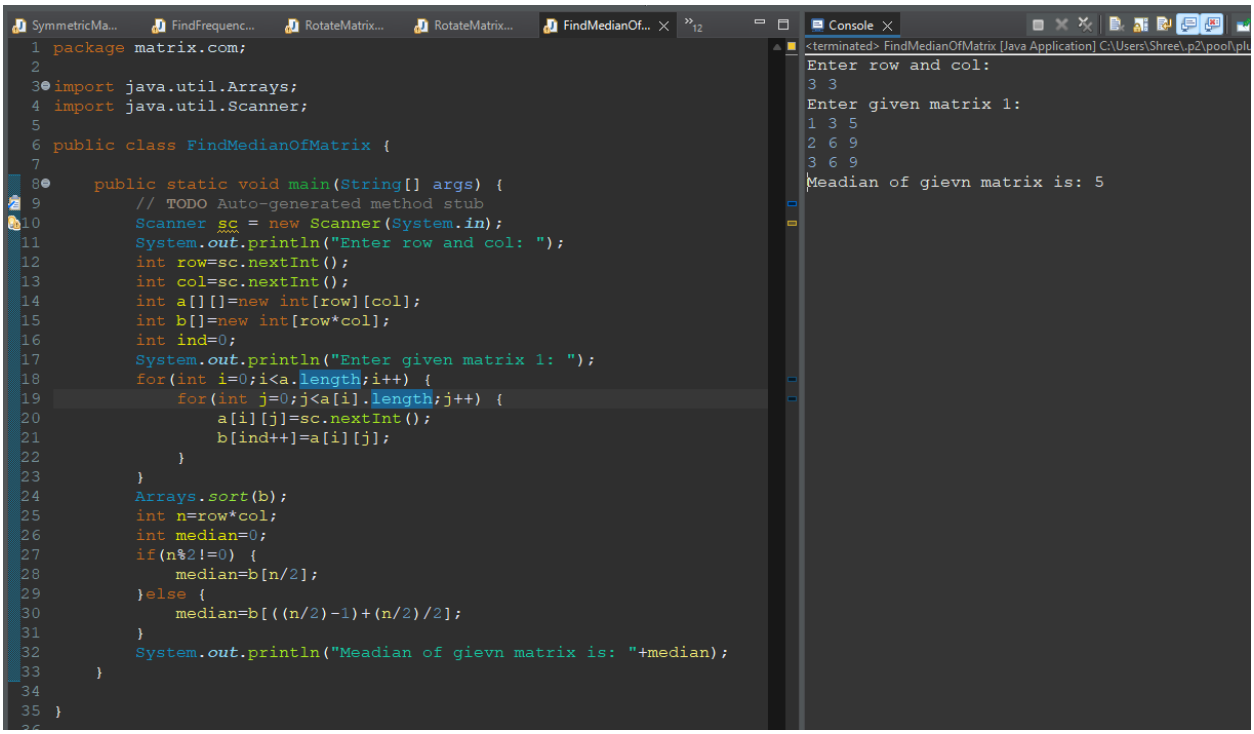
Input:

[1, 3, 5],n=9 m=

[2, 6, 9],

[3, 6, 9]

Output: 5




```java
package matrix.com;

import java.util.Arrays;
import java.util.Scanner;

public class FindMedianOfMatrix {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner sc = new Scanner(System.in);
        System.out.println("Enter row and col: ");
        int row=sc.nextInt();
        int col=sc.nextInt();
        int a[][]=new int[row][col];
        int b[]=new int[row*col];
        int ind=0;
        System.out.println("Enter given matrix 1: ");
        for(int i=0;i<a.length;i++) {
            for(int j=0;j<a[i].length;j++) {
                a[i][j]=sc.nextInt();
                b[ind++]=a[i][j];
            }
        }
        Arrays.sort(b);
        int n=row*col;
        int median=0;
        if(n%2!=0) {
            median=b[n/2];
        }else {
            median=b[((n/2)-1)+(n/2)/2];
        }
        System.out.println("Meadian of gievn matrix is: "+median);
    }

}
```

3. Given a matrix of integers, write a function to find the kth smallest element in the matrix. The matrix is sorted in non-decreasing order both row-wise and column-wise.

Example:

Input:

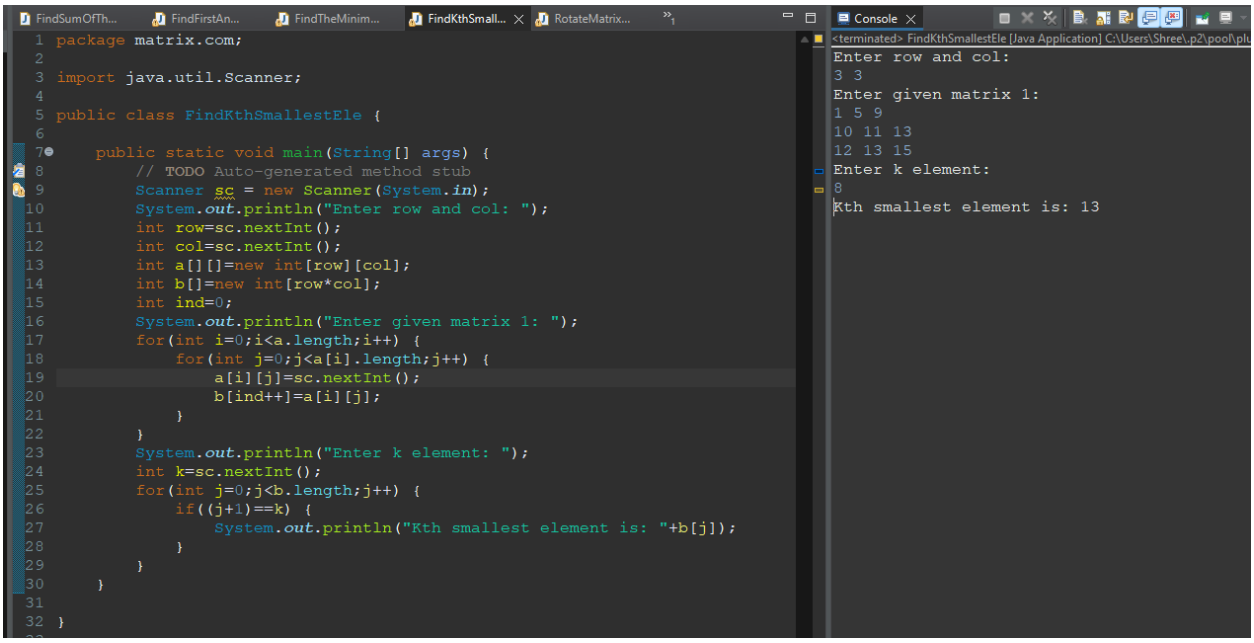
[[1, 5, 9],

[10, 11, 13],

[12, 13, 15]]

k = 8

Output: 13



4. Given a matrix of integers, write a function to rotate it counter-clockwise by 90 degrees.

Example:

Input:

[[1, 2, 3],

[4, 5, 6],

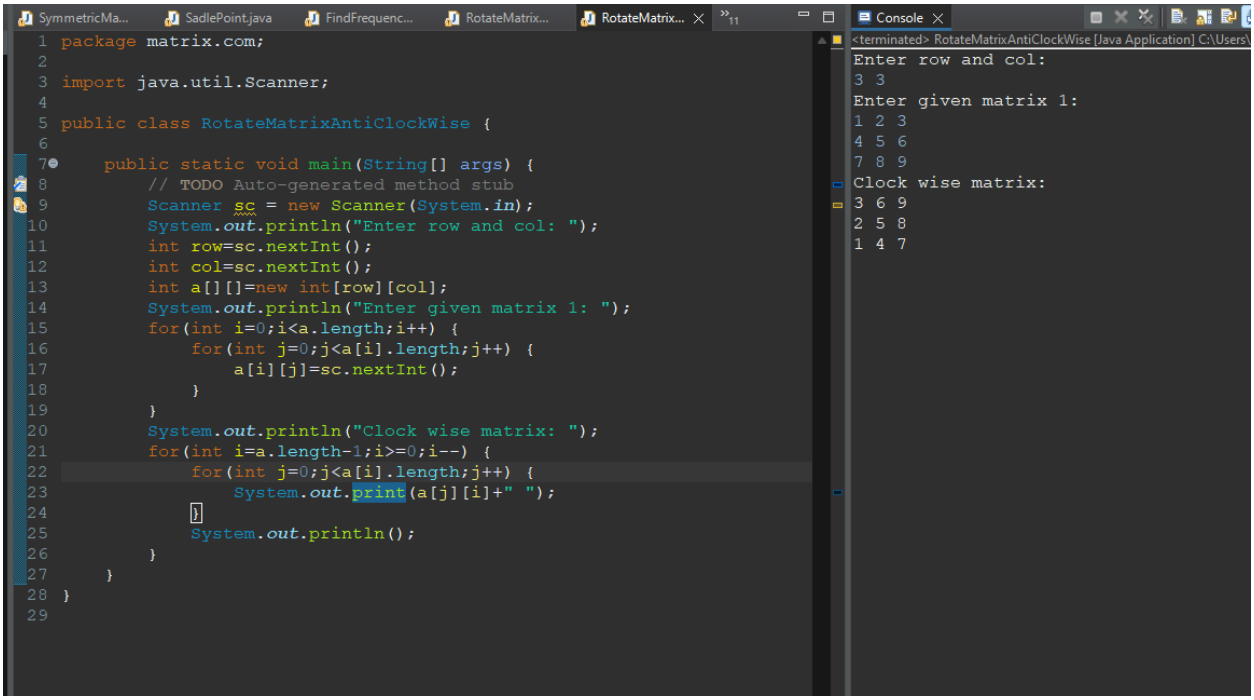
[7, 8, 9]]

Output:

[[3, 6, 9],

[2, 5, 8],

[1, 4, 7]]



```
SymmetricMa...  SadlePoint.java  FindFrequenc...  RotateMatrix...  RotateMatrix...  »11

1  package matrix.com;
2
3  import java.util.Scanner;
4
5  public class RotateMatrixAntiClockWise {
6
7      public static void main(String[] args) {
8          // TODO Auto-generated method stub
9          Scanner sc = new Scanner(System.in);
10         System.out.println("Enter row and col: ");
11         int row=sc.nextInt();
12         int col=sc.nextInt();
13         int a[][]=new int[row][col];
14         System.out.println("Enter given matrix 1: ");
15         for(int i=0;i<a.length;i++) {
16             for(int j=0;j<a[i].length;j++) {
17                 a[i][j]=sc.nextInt();
18             }
19         }
20         System.out.println("Clock wise matrix: ");
21         for(int i=a.length-1;i>=0;i--) {
22             for(int j=0;j<a[i].length;j++) {
23                 System.out.print(a[j][i]+" ");
24             }
25             System.out.println();
26         }
27     }
28 }
29
```

```
Console
<terminated> RotateMatrixAntiClockWise [Java Application] C:\Users\
Enter row and col:
3 3
Enter given matrix 1:
1 2 3
4 5 6
7 8 9
Clock wise matrix:
3 6 9
2 5 8
1 4 7
```