EXPERIMENT NO 3 : Write a menu driven program to perform Addition, Subtrction, Multiplication & Transpose of two matrices

- Addition & Subtraction of two matrix

```
import java.util.Scanner;

public class mataddsub
 {
  public static void main(String args[])
{
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter number of rows in matrix : ");
        int r = scanner.nextInt();
        System.out.print("Enter number of columns in matrix : ");
        int c = scanner.nextInt();
        int[][] matrix1 = new int[r][c];
        int[][] matrix2 = new int[r][c];

        System.out.println("Enter the elements in first matrix :");
        for (int i = 0; i < r; i++) {
              for (int j = 0; j < c; j++) {
                    matrix1[i][j] = scanner.nextInt();
              }
        }
        System.out.println("Enter the elements in second matrix :");
        for (int i = 0; i < r; i++) {
              for (int j = 0; j < c; j++) {
                    matrix2[i][j] = scanner.nextInt();
              }
        }

        int[][] resultMatix = new int[r][c];
        for (int i = 0; i < r; i++) {
              for (int j = 0; j < c; j++) {
                    resultMatix[i][j] = matrix1[i][j] + matrix2[i][j];
              }
        }

        int[][] subMatix = new int[r][c];
        for (int i = 0; i < r; i++) {
              for (int j = 0; j < c; j++) {
                    subMatix[i][j] = matrix1[i][j] - matrix2[i][j];
              }
        }


        System.out.printf("\nFirst%dx%d matrix is :\n",r,c);
        for (int i = 0; i < r; i++) {
              for (int j = 0; j < c; j++) {
                    System.out.print(matrix1[i][j] + " ");
              }
              System.out.println();
        }
```

```
            System.out.printf("\nSecond %dx%d matrix is :\n",r,c);
            for (int i = 0; i < r; i++)
           {
                for (int j = 0; j < c; j++)
               {
                    System.out.print(matrix2[i][j] + " ");
                }
                System.out.println();
            }

            System.out.printf("\nThe sum of the two%dx%d matrices is :\n",r,c);
            for (int i = 0; i < r; i++)
        {
                for (int j = 0; j < c; j++)
                {
                    System.out.print(resultMatix[i][j] + " ");
                }
                System.out.println();
         }
      System.out.printf("\nThe subtraction of the two %dx%d matrices is :\n",r,c);
            for (int i = 0; i < r; i++)
         {
                for (int j = 0; j < c; j++)
               {
                    System.out.print(subMatix[i][j] + " ");
                }
                System.out.println();
            }
     }
    }
```

Output

```
C:\Users\abhishek123>cd desktop
C:\Users\abhishek123\Desktop>javac mataddsub.java

C:\Users\abhishek123\Desktop>java mataddsub

Enter number of rows in matrix : 3
Enter number of columns in matrix : 3
Enter the elements in first matrix :
10 20 30 40 50 60 70 80 90
Enter the elements in second matrix :
1 2 3 4 5 6 7 8 9
First3x3 matrix is :
10 20 30
40 50 60
70 80 90
Second 3x3 matrix is :
1 2 3
4 5 6
7 8 9

The sum of the two3x3 matrices is :
11 22 33
44 55 66
77 88 99

The subtraction of the two 3x3 matrices is :
9 18 27
36 45 54
63 72 81
```

Multiplication of two matrix

```
import java.util.Scanner;
class Matmult
{
 public static void main(String args [ ])
 {
 Scanner scanner = new Scanner(System.in);
  System.out.print("Enter number of rows in first matrix : ");
 int r1 = scanner.nextInt();

 System.out.print("Enter number of columns in first matrix / rows in matrix2: ");
 int c1 = scanner.nextInt();
  int r2=c1;


  System.out.print("Enter number of columns in second matrix : ");
 int c2 = scanner.nextInt();

  int[][] matrix1 = new int[r1][c1];
  int[][] matrix2 = new int[r2][c2];

  System.out.println("Enter the first matrix in elements :");
       for (int i = 0; i < r1; i++)
    {
          for (int j = 0; j < c1; j++)
         {
             matrix1[i][j] = scanner.nextInt();
          }
       }

  System.out.println("Enter the second matrix elements:");
       for (int i = 0; i < r2; i++)
      {
          for (int j = 0; j < c2; j++)
         {
             matrix2[i][j] = scanner.nextInt();
          }
       }
```

```
int[][] productMatrix  = new int[r1][c2];
      for (int i = 0; i < r1; i++)
    {
         for (int j = 0; j < c2; j++)
       {
            for (int k = 0; k < r2; k++)
           {
               productMatrix[i][j] = productMatrix[i][j] + matrix1[i][k] * matrix2[k][j];
           }
        }
      }


System.out.printf("\nFirst %dX%dmatrix is : \n",r1,c1);
            for (int i = 0; i < r1; i++) {
                for (int j = 0; j < c1; j++) {
                      System.out.print(matrix1[i][j] + " ");
                }
                System.out.println();
            }

      System.out.printf("\nSecond %d X %dmatrix is :\n",r2,c2);
            for (int i = 0; i < r2; i++)
          {
                for (int j = 0; j < c2; j++)
               {
                      System.out.print(matrix2[i][j] + " ");
                }
                System.out.println();
            }


      System.out.printf("\nProduct of matrix1 and matrix2 is below %dX%d
matrix\n",r1,c2);
      for (int i = 0; i < r1; i++)
      {
         for (int j = 0; j < c2; j++)
       {
            System.out.print(productMatrix[i][j] + " ");
         }
         System.out.println();
      }
  }
}
```

OUTPUT

```
C:\Users\abhishek123>cd desktop
C:\Users\abhishek123\Desktop>javac matmult.java
C:\Users\abhishek123\Desktop>java Matmult
Enter number of rows in first matrix : 3
Enter number of columns in first matrix / rows in matrix2: 3
Enter number of columns in second matrix : 2
Enter the first matrix in elements :
1
2
3
4
5
6
7
8
9
Enter the second matrix elements:
1
1
1
1
1
1

First 3X3matrix is :
1 2 3
4 5 6
7 8 9

Second 3 X 2matrix is :
1 1
1 1
1 1
Product of matrix1 and matrix2 is below 3X2 matrix
6  6
15 15
24 24
```

Transpose of matrix

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

        Scanner scanner = new Scanner(System.in);
        System.out.println("Enter number of rows in matrix : ");
        int r = scanner.nextInt();
        System.out.print("Enter number of columns in matrix : ");
        int c= scanner.nextInt();
        int matrix[][] = new int[r][c];
        System.out.printf("Enter the elements of %dx%dmatrix is :\n",r,c);
        for (int i = 0; i < r; i++)
      {
            for (int j = 0; j < c; j++)
          {
                matrix[i][j] = scanner.nextInt();
            }
        }

        int transpose[][] = new int[c][r];
        for (int i = 0; i < r; i++)
       {
            for (int j = 0; j < c; j++)
             {
                transpose[j][i] = matrix[i][j];
             }
        }

        System.out.printf("\nEntered %dx%dmatrix is :\n",r,c);
        for (int i = 0; i < r; i++)
      {
            for (int j = 0; j < c; j++)
           {
                System.out.print(matrix[i][j] + "   ");
            }
            System.out.println();
        }


        System.out.printf("\nTranspose of entered %dx%dmatrix is :\n",r,c);
        for (int i = 0; i < c; i++) {
            for (int j = 0; j < r; j++)
          {
                System.out.print(transpose[i][j] + "   ");
          }
            System.out.println();
        }
    }
}
```

Output

```
C:\Users\abhishek123>cd desktop
C:\Users\abhishek123\Desktop>javac transpose.java

C:\Users\abhishek123\Desktop>java transpose
Enter number of rows in matrix :
3
Enter number of columns in matrix : 5
Enter the elements of 3x5matrix is :
11 22 33 44 55 12 24 36 48 60 13 26 39 52 65

Entered 3x5matrix is :
11  22  33  44  55
12  24  36  48  60
13  26  39  52  65

Transpose of entered 3x5matrix is :
11  12  13
22  24  26
33  36  39
44  48  52
55  60  65

C:\Users\abhishek123\Desktop>
```