

1] Write a Program in Java to add, subtract, multiply and transpose of two matrices.

```
package Practical6;
import java.util.Scanner;

public class Matrix {
    public static int[][] add(int[][] A, int[][] B, int rows, int cols) {
        int[][] sum = new int[rows][cols];
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                sum[i][j] = A[i][j] + B[i][j];
        return sum;
    }
    public static int[][] subtract(int[][] A, int[][] B, int rows, int cols) {
        int[][] diff = new int[rows][cols];
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                diff[i][j] = A[i][j] - B[i][j];
        return diff;
    }
    public static int[][] multiply(int[][] A, int[][] B, int rows, int cols) {
        int[][] product = new int[rows][cols];
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++) {
                product[i][j] = 0;
                for (int k = 0; k < cols; k++)
                    product[i][j] += A[i][k] * B[k][j];
            }
        return product;
    }
    public static int[][] transpose(int[][] A, int rows, int cols) {
        int[][] trans = new int[cols][rows];
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                trans[j][i] = A[i][j];
        return trans;
    }
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter number of rows: ");
        int rows = sc.nextInt();
        System.out.print("Enter number of columns: ");
        int cols = sc.nextInt();
        int[][] A = new int[rows][cols];
        int[][] B = new int[rows][cols];
        System.out.println("Enter elements of Matrix A:");
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                A[i][j] = sc.nextInt();
        System.out.println("Enter elements of Matrix B:");
        for (int i = 0; i < rows; i++)
            for (int j = 0; j < cols; j++)
                B[i][j] = sc.nextInt();
        int[][] sum = add(A, B, rows, cols);
        System.out.println("\nAddition of matrices:");
    }
}
```

```

for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        System.out.print(sum[i][j] + " ");
    }
    System.out.println();
}
int[][] diff = subtract(A, B, rows, cols);
System.out.println("\nSubtraction of matrices:");
for (int i = 0; i < rows; i++) {
    for (int j = 0; j < cols; j++) {
        System.out.print(diff[i][j] + " ");
    }
    System.out.println();
}
if (rows == cols) {
    int[][] product = multiply(A, B, rows, cols);
    System.out.println("\nMultiplication of matrices:");
    for (int i = 0; i < rows; i++) {
        for (int j = 0; j < cols; j++) {
            System.out.print(product[i][j] + " ");
        }
        System.out.println();
    }
} else {
    System.out.println("\nMultiplication not possible (matrix must be square)");
}
int[][] trans = transpose(A, rows, cols);
System.out.println("\nTranspose of Matrix A:");
for (int i = 0; i < cols; i++) {
    for (int j = 0; j < rows; j++) {
        System.out.print(trans[i][j] + " ");
    }
    System.out.println();
}
}
}

```

Console × Matrix.java  
<terminated> Matrix [Java Application] C:\Users\Megha\p2\pool\p

```

Enter number of rows: 2
Enter number of columns: 2
Enter elements of Matrix A:
2 4
3 5
Enter elements of Matrix B:
1 3
2 4
|
Addition of matrices:
3 7
5 9

Subtraction of matrices:
1 1
1 1

Multiplication of matrices:
10 22
13 29

Transpose of Matrix A:
2 3
4 5

```