/*
Program 01 : Matrix Addition
Develop a JAVA program to add TWO matrices of suitable order mxn and rxp
The input values should be read from command line arguments) and print the resultant matrix on console.
***/**

```
// defining package
package first;

// importing Scanner class for getting an input through keyboard
import java.util.Scanner;

// starting main method

public class MatrixAddition {
   public static void main(String[] args)
   {
         // creating an object sc for Scanner class
         Scanner sc= new Scanner(System.in);

      //  declaring variables m,n
      int m,n ;

      System.out.println(" Enter the order of first matrix m and n.");

      // getting m and n as integer numbers  through keyboard
      m=sc.nextInt();
      n=sc.nextInt();

   //  declaring variables r,p;
      int r,p ;

      System.out.println(" Enter the order of second matrix r and p.");

    // getting m and n as integer numbers  through keyboard
      r=sc.nextInt();
      p=sc.nextInt();


      // Check if  a positive integer
      if (r <= 0 || p<=0 || m<=0 || n<=0) {
         System.out.println("Please provide a valid positive integer for the order of the matrix");
         return;
      }

      // Check if addition is possible

      if (m!=r  || n!=p ) {
         System.out.println("Please provide  same order for the both matrices.");
```

```
        return;
    }

    // Declaring three matrices with right order
    int[][] matrix1 = new int[m][n];
    int[][] matrix2 = new int[r][p];
    int[][] resultMatrix = new int[m][n];

    System.out.println("\nEnter the elements of Matrix1 :");
    // Calling getMatix to get the elements of matrix1
    getMatrix(matrix1, m,n);
    System.out.println("\nEnter the elements of Matrix2 :");
    // Calling getMatix to get the elements of matrix2
    getMatrix(matrix2, r,p);

    // Print the matrices

    System.out.println("Matrix 1:");
    printMatrix(matrix1,m,n);

    System.out.println("\nMatrix 2:");
    printMatrix(matrix2,r,p);

    // Add the matrices
    addMatrices(matrix1, matrix2,m,n, resultMatrix);

    // Print the resultant matrix
    System.out.println("\nResultant Matrix (Matrix1 + Matrix2):");
    printMatrix(resultMatrix,m,n);
}

// Helper method to get a matrix  with input values through keyboard
private static void getMatrix(int[][] matrix, int m, int n) {
        int x;
        Scanner sc= new Scanner(System.in);
    for (int i = 0; i < m; i++) {
        for (int j = 0; j <n; j++) {
            matrix[i][j] = sc.nextInt();
        }
    }
}

// Helper method to add two matrices
private static int[][] addMatrices(int[][] matrix1, int[][] matrix2, int m, int n, int[][] resultMatrix) {

    for (int i = 0; i < m; i++) {
        for (int j = 0; j < n; j++) {
            resultMatrix[i][j] = matrix1[i][j] + matrix2[i][j];
        }
```

```
        }

        return resultMatrix;
    }

    // Helper method to print a matrix
    private static void printMatrix(int[][] matrix, int m, int n) {
            for (int i = 0; i < m; i++) {
            for (int j = 0; j < n; j++) {
                    System.out.print(matrix[i][j]+" ");
            }
            System.out.println();
         }


        }
    }
```

i/p and o/p

Enter the order of first matrix m and n.
3 2
Enter the order of second matrix r and p.
3 2

Enter the elements of Matrix1 :
1
2
3
4
5
6

Enter the elements of Matrix2 :
1
1
1
1
1
1
Matrix 1:
1 2
3 4
5 6

Matrix 2:
1 1
1 1
1 1

Resultant Matrix (Matrix1 + Matrix2):
2 3
4 5
6 7

Exercise programs

b. Matrix Subtraction
Develop a JAVA program to add TWO matrices of suitable order mxn and rxp
The input values should be read from command line arguments) and print the resultant matrix on console.

c. Matrix Multiplication
Develop a JAVA program to add TWO matrices of suitable order mxn and rxp
The input values should be read from command line arguments) and print the resultant matrix on console.

[Hint : Matrices mx n and rxp

Check n should be equal to r for Matrix multiplication or should report

Perform the matrix multiplication as follows

As the result matrix order is m x p

```
for ( i .. for m )
  for( j…for p)
      for (k... for n or p)
            resultmatrix[i][j]=resultmatrix[i][j]+matrix1[i][k]*matrix2[k][j];
```

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