Question 8

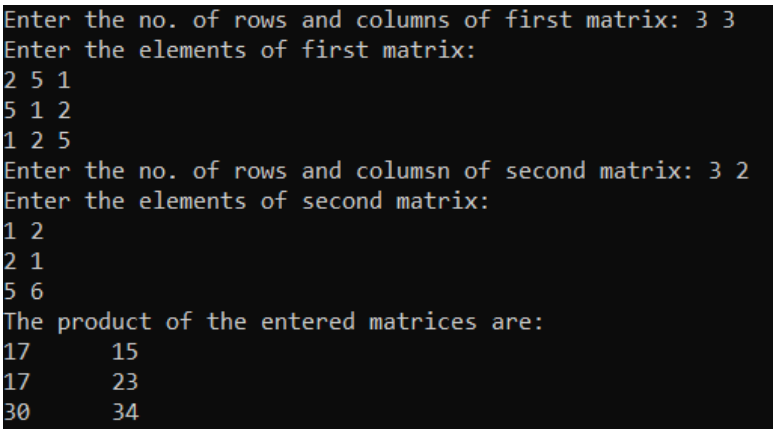
Write a program to multiply two matrices

```
import java.util.Scanner;

class MatrixMultiplication {
    public static void main(String args[]) {
        int[][] matrix1 = new int[10][10];
        int[][] matrix2 = new int[10][10];
        int[][] matrix3 = new int[10][10];
        int i, j, m, n, p, q, k, sum = 0;

        Scanner obj = new Scanner(System.in);

        System.out.print("Enter the no. of rows and columns of first matrix: ");
        m = obj.nextInt();
        n = obj.nextInt();

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

        for (i = 0; i < m; i++) {
            for (j = 0; j < n; j++) {
                matrix1[i][j] = obj.nextInt();
            }
        }

        System.out.print("Enter the no. of rows and columsn of second matrix: ");
        p = obj.nextInt();
        q = obj.nextInt();

        if (n != p)
        System.out.println("Matrices with the entered orders can't be mulitplied with each other");
        else {
            System.out.println("Enter the elements of second matrix:");

            for (i = 0; i < p; i++) {
                for (j = 0; j < q; j++) {
                    matrix2[i][j] = obj.nextInt();
                }
            }

            //Multiplication starts from here....
            System.out.println("The product of the entered matrices:");
            for (i = 0; i < m; i++) {
                for (j = 0; j < q; j++) {
                    for (k = 0; k < p; k++) {
                        sum = sum + matrix1[i][k] * matrix2[k][j];
                    }

                    matrix3[i][j] = sum;
                    sum = 0;
                    System.out.print(matrix3[i][j] + " ");
                }
                System.out.println();
            }

            //Multiplication ends here..
        }
    }
}
```

OR

```
import java.util.Scanner;
public class Matrix {
    public static void main(String args[]) {
        int row1, col1, row2, col2;
        Scanner s = new Scanner(System.in);
        System.out.print("Enter the no. of rows in first matrix: ");
        row1 = s.nextInt();
        System.out.print("Enter the no. of columns in first matrix: ");
        col1 = s.nextInt();
        System.out.print("Enter the no. of rows in second matrix: ");
        row2 = s.nextInt();
        System.out.print("Enter the no. of columns in second matrix: ");
        col2 = s.nextInt();

        if (col1 != row2) {
            System.out.println("Matrix multiplication is not possible");
            s.close();
            return;
        }
        int a[][] = new int[row1][col1];
        int b[][] = new int[row2][col2];
        int c[][] = new int[row1][col2];

        System.out.println("\nEnter values for Matrix A:");
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col1; j++) {
                a[i][j] = s.nextInt();
            }
        }
        System.out.println("\nEnter values for Matrix B:");
        for (int i = 0; i < row2; i++) {
            for (int j = 0; j < col2; j++) {
                b[i][j] = s.nextInt();
            }
        }

        System.out.println("\nMatrix Multiplication is:");
        for (int i = 0; i < row1; i++) {
            for (int j = 0; j < col2; j++) {
                c[i][j] = 0;
                for (int k = 0; k < row2; k++) {  // or it can also be k < col1 as col1 = row2 during matrix multiplication
                    c[i][j] += a[i][k] * b[k][j];
                }
                System.out.print(c[i][j] + " ");
            }
            System.out.println();
        }

        s.close();
    }
}
```

Output:



{The above output is of the first code, the second code will have a slightly different output}