EXPERIMENT No: 2.

Matrix Multiplication.

Aim

To implement a java program to multiply two given matrices.

Input

Two matrices of order $m_1 \times n_1$ and $m_2 \times n_2$

Output Expected

Product of two matrices.

Processing

Accept two numbers of two input matrices and keep them in two 2D arrays A and B. Check wether multiplication is possible by validating the order of 2D input arrays and then perform multiplication.

Algorithm

1 Enter the rows and columns of matrix 1 m_1 & n_1
2 for i = 0 to i = m_1
3 for j = 0 to j = n_1
4 Input A[i][j]
5 Repeat Steps 1 to 4 to input matrix 2
6 If $m_1 \neq m_2$
Print "Multiplication not possible"

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7. Else
8 for i:0 till m1 do
9 for j:0 till m2 do
10 set S[i][j]:0
11 for k:0 till m1 do
12 set S[i][j] + = A[i][k] * B[k][j]
13 Endfor.
14 Print S[i][j]
15 Endfor
16 Endfor
17 End If
18 Stop

Result

Output is obtained.

Output-

```
Enter the no: of rows of Matrix A
3
Enter the no: of columns of Matrix A
3
Enter the no: of rows of matrix B
3
Enter the no: of columns of matrix B
3
Enter matrix A
1
2
3
4
6
4
2
7
1
Enter Matrix B
2
6
8
3
8
3
7
6
3
Resultant matrix
29  40  28
54  96  62
56  62  40
```

```
import java.util.*;
public class matrix
{
public static void main(String args[])
{
    int[][] A= new int[30][30];
    int[][] B= new int[30][30];
    int[][] S= new int[30][30];
    int r,c,i,j,k;

    Scanner sc = new Scanner(System.in);
    System.out.println("enter the no.of rows;\n");
    r=sc.nextInt();
    System.out.println("enter the no.of columns;\n");
    c=sc.nextInt();

    System.out.println("enter the first matrix;\n");
    for(i=0;i<r;i++)
    {
       for(j=0;j<c;j++)
          A[i][j]=sc.nextInt();
    }

    System.out.println("enter the second matrix;\n");
    for(i=0;i<r;i++)
    {
       for(j=0;j<c;j++)
          B[i][j]=sc.nextInt();
    }

    System.out.println("Resultant matrix=\n");
    for(i=0;i<r;i++)
     {
       for(j=0;j<c;j++)


       {
          S[i][j]=0;
          for(k=0;k<r;k++)
          {
              S[i][j]+=A[i][j]*B[k][j];
        }

          System.out.println(S[i][j]+"\t");
       }

    System.out.println("\n");
    }
    }
    }
```