

Aim:

Write a program to find the multiplication of two matrices.

At the time of execution, the program should print the message on the console as:

```
Enter the row & column sizes of matrix-1 :
```

For example, if the user gives the **input** as:

```
Enter the row & column sizes of matrix-1 : 3 2
```

Next, the program should print the message on the console as:

```
Enter matrix-1 6 elements :
```

if the user gives the **input** as:

```
Enter matrix-1 6 elements : 1 2 3 4 5 6
```

Next, the program should print the message on the console as:

```
Enter the row & column sizes of matrix-2 :
```

if the user gives the **input** as:

```
Enter the row & column sizes of matrix-2 : 2 3
```

Next, the program should print the message on the console as:

```
Enter matrix-2 6 elements :
```

if the user gives the **input** as:

```
Enter matrix-2 6 elements : 4 5 6 7 8 9
```

then the program should **print** the result as:

```
The given matrix-1 is
1 2 3
4 5 6
The given matrix-2 is
4 5
6 7
8 9
Multiplication of two matrices is
40 46
94 109
```

Note: 1 Do use the **printf()** function with a **newline** character (`\n`).

Note: 2 Display **Mltiplication is not possible** if multiplication operation can not be performed.

Source Code:

```

#include<stdio.h>
int main()
{
    int r1,r2,c1,c2,a[100][100],b[100][100],mul[100][100],i,j,k;
    printf("Enter the row & column sizes of matrix-1 : ");
    scanf("%d%d",&r1,&c1);
    printf("Enter matrix-1 %d elements : ",r1*c1);
    for (i=0;i<r1;++i)
    for (j=0;j<c1;++j)
    scanf("%d",&a[i][j]);
    printf("Enter the row & column sizes of matrix-2 : ");
    scanf("%d%d",&r2,&c2);
    printf("Enter matrix-2 %d elements : ",r2*c2);
    for (i=0;i<r2;++i)
    for (j=0;j<c2;++j)
    scanf("%d",&b[i][j]);
    if(c1==r2)
    {
        for (i = 0; i < r1; ++i)
        for (j = 0; j < c2; ++j)
        mul[i][j]=0;
        for (i = 0; i < r1; ++i)
        for (j = 0; j < c2; ++j)
        for (k = 0; k < r2; ++k)
        mul[i][j] += a[i][k] * b[k][j];
        printf("The given matrix-1 is\n");
        for (i=0;i<r1;++i)
        {
            for (j=0;j<c1;++j)
            {
                printf("%d ",a[i][j]);
            }
            printf("\n");
        }
        printf("The given matrix-2 is\n");
        for (i=0;i<r2;++i)
        {
            for (j=0;j<c2;++j)
            {
                printf("%d ",b[i][j]);
            }
            printf("\n");
        }
        printf("Multiplication of two matrices is\n");
        for(i = 0; i < r1; ++i)
        {
            for(j = 0; j < c2; ++j)
            {
                printf("%d ",mul[i][j]);
            }
            printf("\n");
        }
    }
    else

```

```

{
    printf("The given matrix-1 is\n");
    for(i=0;i<r1;++i)
    {
        for(j=0;j<c1;++j)
        {
            printf("%d ",a[i][j]);
        }
        printf("\n");
    }

    printf("The given matrix-2 is\n");
    for(i=0;i<r2;++i)
    {
        for(j=0;j<c2;++j)
        {
            printf("%d ",b[i][j]);
        }
        printf("\n");
    }
    printf("Multiplication is not possible\n");
}
return 0;
}

```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter the row & column sizes of matrix-1 : 2 2
Enter matrix-1 4 elements : 11 33 22 44
Enter the row & column sizes of matrix-2 : 2 2
Enter matrix-2 4 elements : 11 33 44 22
The given matrix-1 is
11 33
22 44
The given matrix-2 is
11 33
44 22
Multiplication of two matrices is
1573 1089
2178 1694

Test Case - 2
User Output
Enter the row & column sizes of matrix-1 : 2 3
Enter matrix-1 6 elements : 1 2 3 4 5 6
Enter the row & column sizes of matrix-2 : 3 2
Enter matrix-2 6 elements : 1 2 3 4 5 6
The given matrix-1 is
1 2 3
4 5 6

The given matrix-2 is
1 2
3 4
5 6
Multiplication of two matrices is
22 28
49 64

Test Case - 3
User Output
Enter the row & column sizes of matrix-1 : 2 3
Enter matrix-1 6 elements : 1 2 3 4 5 6
Enter the row & column sizes of matrix-2 : 2 2
Enter matrix-2 4 elements : 1 2 3 4
The given matrix-1 is
1 2 3
4 5 6
The given matrix-2 is
1 2
3 4
Multiplication is not possible

Test Case - 4
User Output
Enter the row & column sizes of matrix-1 : 3 3
Enter matrix-1 9 elements : 11 22 33 44 55 66 77 88 99
Enter the row & column sizes of matrix-2 : 3 3
Enter matrix-2 9 elements : 99 88 77 66 55 44 33 22 11
The given matrix-1 is
11 22 33
44 55 66
77 88 99
The given matrix-2 is
99 88 77
66 55 44
33 22 11
Multiplication of two matrices is
3630 2904 2178
10164 8349 6534
16698 13794 10890