

**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,c1,r2,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                                      |