Aim:

Write a C program to perform matrix multiplication on two dimensional matrix.

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 : 2 2
```

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

```
Enter matrix-1 4 elements :
```

If the user gives the input as:

```
Enter matrix-1 4 elements : 1 1 2 2
```

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 2
```

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

```
Enter matrix-2 4 elements :
```

If the user gives the input as:

```
Enter matrix-2 4 elements : 1 2 7 4
```

Then the program should print the result as:

```
The given matrix-1 is
1 1
2 2
The given matrix-2 is
1 2
7 4
Multiplication of two matrices is
8 6
16 12
```

Otherwise, the program should print the result as :

Multiplication is not possible

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

Source Code:

matmul.c

```c
#include<stdio.h>
void main()
{
    int i,j,n,m,p,q,k;
    int a[5][5],b[5][5],c[5][5];
    printf("Enter the row & column sizes of matrix-1 : ");
    scanf("%d %d",&m,&n);
    printf("Enter matrix-1 %d elements : ",m*n);
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            scanf("%d",&a[i][j]);
        }
    }
    printf("Enter the row & column sizes of matrix-2 : ");
    scanf("%d %d",&p,&q);
    printf("Enter matrix-2 %d elements : ",p*q);
    for(i=0;i<p;i++)
    {
        for(j=0;j<q;j++)
        {
            scanf("%d",&b[i][j]);
        }
    }
    printf("The given matrix-1 is\n");
    for(i=0;i<m;i++)
    {
        for(j=0;j<n;j++)
        {
            printf("%d ",a[i][j]);
        }
        printf("\n");
    }
    printf("The given matrix-2 is\n");
    for(i=0;i<p;i++)
    {
        for(j=0;j<q;j++)
        {
            printf("%d ",b[i][j]);
        }
        printf("\n");
    }
    if(n==p)
    {
```

```c
        for(i=0;i<m;i++)
        {
            for(j=0;j<q;j++)
            {
                c[i][j]=0;
                for(k=0;k<p;k++)
                {
                    c[i][j]=c[i][j]+a[i][k]*b[k][j];
                }
            }
        }
        printf("Multiplication of two matrices is\n");
        for(i=0;i<m;i++)
        {
            for(j=0;j<q;j++)
            {
                printf("%d ",c[i][j]);
            }
            printf("\n");
        }
    }
    else
    {
        printf("Multiplication is not possible\n");
    }
}
```

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 : 1 2 3 4
Enter the row & column sizes of matrix-2 : 2 2
Enter matrix-2 4 elements : 4 5 6 7
The given matrix-1 is
1 2
3 4
The given matrix-2 is
4 5
6 7
Multiplication of two matrices is
16 19
36 43

Test Case - 2
User Output
Enter the row & column sizes of matrix-1 : 2 2
Enter matrix-1 4 elements : 1 1 2 2
Enter the row & column sizes of matrix-2 : 2 2
Enter matrix-2 4 elements : 1 2 7 4
The given matrix-1 is

1 1
2 2
The given matrix-2 is
1 2
7 4
Multiplication of two matrices is
8 6
16 12