S.No: 16	Exp. Name: ***Write a C program to perform matrix multiplication***	Date:2023-04-20

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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

```
#include<stdio.h>
void main()
{
   int i,j,k,m,n,p,q;
   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)
   {
```


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```
      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