S.No: 24	Exp. Name: ***Write a C program to find the Multiplication of Two matrices by checking compatibility***	Date:2023-01-17

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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:

Program513.c

```
#include<stdio.h>
int main()
{
   int a[100][100],b[100][100],mul[100][100],i,j,k,c1,c2,r1,r2;
   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<c1;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");
      }
   }
```


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```
    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