| S.No: 24 | Exp. Name: ***Write a C program to find the Multiplication of Two matrices by checking compatibility*** | Date:2023-01-14 |
|---|---|---|









## 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 **MItiplication is not possible** if multiplication operation can not be performed.

## Source Code:

Program513.c

```
#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
```


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```
    {
       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 |