S.No: 25	Exp. Name: ***Write a Program to check whether the given Matrix is Symmetric or not***	Date:2023-01-13

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Aim:

Write a **C** program to find whether a given matrix is a `symmetric matrix` or not.

Hint: A **symmetric matrix** is a square matrix that is equal to its **transpose**.

At the time of execution, the program should print the message on the console as:

```
Enter the order of matrix :
```

For example, if the user gives the **input** as:

```
Enter the order of matrix : 2 2
```

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

```
Enter 4 elements :
```

if the user gives the **input** as:

```
Enter 4 elements : 4 5 5 4
```

then the program should **print** on the console as:

```
The given matrix is
4 5
5 4
Transpose of the given matrix is
4 5
5 4
The given matrix is symmetric matrix
```

If the condition is **true**, then the program should **print** the result as :

```
The given matrix is symmetric matrix
```

Otherwise, the program should **print** the result as :

```
The given matrix is not symmetric matrix
```

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

Source Code:

SymmetricMatrix.c

```
#include<stdio.h>
int main()
{
   int m,n,c,d,matrix[10][10],transpose[10][10];
   printf("Enter the order of matrix : ");
   scanf("%d%d",&m,&n);
   printf("Enter %d elements : ",m*n);
   for (c = 0; c < m; c++)
   for (d = 0; d < n; d++)
```

```
    scanf("%d",&matrix[c][d]);
    printf("The given matrix is\n");
     for(c=0;c<m;c++)
     {
       for(d=0;d<n;d++)
       {
          printf("%d ",matrix[c][d]);
       }
       printf("\n");
     }
     for(c=0;c<m;c++)
     for(d=0;d<n;d++)
     transpose[d][c]=matrix[c][d];
     printf("Transpose of the given matrix is\n");
     for(c=0;c<n;c++)
     {
       for(d=0;d<m;d++)
       {
          printf("%d ",transpose[c][d]);
       }
       printf("\n");
     }
     if(m==n)
     {
       for(c=0;c<m;c++)
       {
          for(d=0;d<n;d++)
          {
             if(matrix[c][d]!=transpose[c][d])
             break;
          }
          if(d!=m)
          break;
       }
       if(c==m)
       printf("The given matrix is symmetric matrix\n");
       else
       printf("The given matrix is not symmetric matrix\n");
     }
     else
     printf("The given matrix is not symmetric matrix\n");
     return 0;
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter the order of matrix : 2 2
Enter 4 elements : 1 2 3 4
The given matrix is
1 2
3 4

Transpose of the given matrix is
1 3
2 4
The given matrix is not symmetric matrix

Test Case - 2
User Output
Enter the order of matrix : 2 2
Enter 4 elements : 4 5 5 4
The given matrix is
4 5
5 4
Transpose of the given matrix is
4 5
5 4
The given matrix is symmetric matrix

Test Case - 3
User Output
Enter the order of matrix : 3 2
Enter 6 elements : 1 2 3 4 5 6
The given matrix is
1 2
3 4
5 6
Transpose of the given matrix is
1 3 5
2 4 6
The given matrix is not symmetric matrix

Test Case - 4
User Output
Enter the order of matrix : 3 3
Enter 9 elements : 1 1 1 1 1 1 1 1 1
The given matrix is
1 1 1
1 1 1
1 1 1
Transpose of the given matrix is
1 1 1
1 1 1
1 1 1
The given matrix is symmetric matrix