S.No: 25	Exp. Name: ***Write a Program to check whether the given Matrix is Symmetric or not***	Date:2023-01-21

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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 n1,n2,i,j,matrix[10][10],transpose[10][10];
   printf("Enter the order of matrix : ");
   scanf("%d%d",&n1,&n2);
   printf("Enter %d elements : ",n1*n2);
   for(i=0;i<n1;i++)
   {
```

```
     for(j=0;j<n2;j++)
     {
        scanf("%d",&matrix[i][j]);
 }
}
   printf("The given matrix is\n");
  for(i=0;i<n1;i++)
  {
     for(j=0;j<n2;j++)
       {
        printf("%d ",matrix[i][j]);
       }
       printf("\n");
}
  for(i=0;i<n1;i++)
   {
     for(j=0;j<n2;j++)
       {
        transpose[j][i]=matrix[i][j];
       }
}
  printf("Transpose of the given matrix is\n");
  for(i=0;i<n2;i++)
  {
     for(j=0;j<n1;j++)
     {
        printf("%d ",transpose[i][j]);
 }
     printf("\n");
}
  if(n1==n2)
  {
    for(i=0;i<n1;i++)
    {
     for(j=0;j<n2;j++)
     {
        if(matrix[i][j]!=transpose[i][j])
        break;
 }
     if(j!=n1)
     break;
    }
       if(i==n1)
       {
      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");
```

```
    }
}
```

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

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```
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
```