S.No: 25	Exp. Name: ***Write a Program to check whether the given Matrix is Symmetric or not***	Date:2023-01-18

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 a[10][10],b[10][10],i,j,r,c,count=0;
   printf("Enter the order of matrix : ");
   scanf("%d%d",&r,&c);
   printf("Enter %d elements : ",r*c);
   for(i=0;i<r;i++)
   {
```

```
      for(j=0;j<c;j++)
      {
         scanf("%d",&a[i][j]);
      }
   }
   printf("The given matrix is\n");
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
         printf("%d ",a[i][j]);
      }
      printf("\n");
   }
   printf("Transpose of the given matrix is\n");
   for(i=0;i<c;i++)
   {
      for(j=0;j<r;j++)
      {
         b[i][j]=a[j][i];
         printf("%d ",b[i][j]);
      }
      printf("\n");
   }
   for(i=0;i<r;i++)
   {
      for(j=0;j<c;j++)
      {
         if(a[i][j]!=b[i][j])
         {
            count++;
         }
      }
   }
   if(count==0)
   {
      printf("The given matrix is 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
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