S.No: 9	Exp. Name: ***Write a C program to Sort given elements using Quick sort***	Date:2023-04-09

Aim:

Write a program to `sort` (`Ascending order`) the given elements using `quick sort` technique.

Note: Pick the first element as pivot. You will not be awarded marks if you do not follow this instruction.

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

```
Enter array size :
```

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

```
Enter array size : 5
```

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

```
Enter 5 elements :
```

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

```
Enter 5 elements : 34 67 12 45 22
```

then the program should **print** the result as:

```
Before sorting the elements are : 34 67 12 45 22
After sorting the elements are : 12 22 34 45 67
```

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

Source Code:

QuickSortMain.c

```
#include <stdio.h>
#include "QuickSortFunctions.c"
void main() {
   int arr[15], i, n;
   printf("Enter array size : ");
   scanf("%d", &n);
   printf("Enter %d elements : ", n);
   for (i = 0; i < n; i++) {
      scanf("%d", &arr[i]);
   }
   printf("Before sorting the elements are : ");
   display(arr, n);
   quickSort(arr, 0, n - 1);
   printf("After sorting the elements are : ");
   display(arr, n);
}
```

QuickSortFunctions.c

```
void swap(int *a,int *b)
{
```

```
    int t=*a;
    *a=*b;
    *b=t;
}
void display(int arr[15], int n)
{
    for(int i=0;i<n;i++)
    {
        printf("%d ",arr[i]);
    }
        printf("\n");
}
int partition(int arr[15], int lb, int ub)
{
    int pivot=arr[ub];
    int i=lb-1;
    for(int j=lb;j<ub;j++)
    {
        if(arr[j]<pivot)
        {
            i=i+1;
            swap(&arr[i],&arr[j]);
        }

    }
    swap(&arr[i+1],&arr[ub]);
    return i+1;
}
void quickSort(int arr[15], int low, int high)
{
    if(low<high)
    {
        int p=partition(arr,low,high);
        quickSort(arr,low,p-1);
        quickSort(arr,p+1,high);
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter array size : 5
Enter 5 elements : 34 67 12 45 22
Before sorting the elements are : 34 67 12 45 22
After sorting the elements are : 12 22 34 45 67

Test Case - 2
User Output
Enter array size : 8
Enter 8 elements : 77 55 22 44 99 33 11 66
Before sorting the elements are : 77 55 22 44 99 33 11 66
After sorting the elements are : 11 22 33 44 55 66 77 99

Test Case - 3
User Output
Enter array size : 5
Enter 5 elements : -32 -45 -67 -46 -14
Before sorting the elements are : -32 -45 -67 -46 -14
After sorting the elements are : -67 -46 -45 -32 -14