

**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 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++;
            swap(&arr[i],&arr[j]);
        }
    }
    swap(&arr[i+1],&arr[ub]);
    return i+1;
}
void quickSort(int arr[15], int lb, int ub) {
    if(lb<ub)
    {
        int pi=partition(arr,lb,ub);
        quickSort(arr,lb,pi-1);
        quickSort(arr,pi+1,ub);
    }
}
void swap(int *a,int *b)
{
    int t = *a;
    *a = *b;
    *b = t;
}

```

### 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
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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