

**Aim:**

Write a program to **search** the given element from a list of elements with **binary search** technique using **recursion**.

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

Enter value of n :

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

Enter value of n : 5

Next, the program should print the following messages one by one on the console as:

Enter 5 elements :

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

Enter 5 elements : 33 55 22 44 11

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

After sorting the elements are : 11 22 33 44 55

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

Enter key element :

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

Enter key element : 11

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

The given key element 11 is found at position : 0

Similarly, if the key element is given as **18** for the above example then the program should print the output as:

The given key element 18 is not found

**Note:** Write the functions **read()**, **bubbleSort()**, **display()** and **binarySearch()** in **BinarySearch.c**

**Source Code:****BinarySearch.c**

```
#include <stdio.h>
void read(int a[20], int n)
{
    int i;
    printf("Enter %d elements : ", n);
    for (i = 0; i < n; i++)
    {
        scanf("%d", &a[i]);
    }
}
```

```
}
void bubbleSort(int a[20], int n)
{
    int i, j, temp;
    for (i = 0; i < n - 1; i++)
    {
        for (j = 0; j < n - i - 1; j++)
        {
            if (a[j] > a[j+1])
            {
                temp = a[j];
                a[j] = a[j+1];
                a[j+1] = temp;
            }
        }
    }
}

void display(int a[20], int n)
{
    int i;
    for (i = 0; i < n; i++)
    {
        printf("%d ", a[i]);
    }
    printf("\n");
}

int binarySearch(int a[20], int low, int high, int key)
{
    int mid;
    if (low <= high)
    {
        mid = (low + high) / 2;
        if (a[mid] == key)
            return mid;
        else if (key < a[mid])
            binarySearch(a, low, mid - 1, key);
        else if (key > a[mid])
            binarySearch(a, mid + 1, high, key);
    }
    else
    {
        return -1;
    }
}

void main()
{
    int a[20], n, key, flag;
    printf("Enter value of n : ");
    scanf("%d", &n);
    read(a, n);
    bubbleSort(a, n);
    printf("After sorting the elements are : ");
    display(a, n);
    printf("Enter key element : ");
    scanf("%d", &key);
    flag = binarySearch(a, 0, n - 1, key);
}
```

```

if (flag == -1)
{
    printf("The given key element %d is not found\n", key);
}
else
{
    printf("The given key element %d is found at position : %d\n", key, flag);
}
}

```

### Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter value of n : 5
Enter 5 elements : 33 55 22 44 11
After sorting the elements are : 11 22 33 44 55 11
Enter key element : 11
The given key element 11 is found at position : 0

Test Case - 2
User Output
Enter value of n : 4
Enter 4 elements : 23 9 45 18
After sorting the elements are : 9 18 23 45 24
Enter key element : 24
The given key element 24 is not found