

Aim:

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

Note: Write the functions **read()**, **bubbleSort()**, **display()** and **binarySearch()** in **Program912a.c**

Source Code:**Program912.c**

```
#include <stdio.h>
#include "Program912a.c"
void main() {
    int a[20], n, key, flag;
    printf("Enter value of n : ");
    scanf("%d", &n);
    read1(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);
    }
}
```

Program912a.c

```
# include <stdio.h>

void read1(int a[],int num){
    printf("Enter %d elements : ",num);
    int i;
    for(i=0;i<num;i++){
        scanf("%d",&a[i]);
    }
}

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

```

    }
}
void display(int a[],int n){
    int i;
    for(i=0;i<n;i++){
        printf("%d ",a[i]);
    }
    printf("\n");
}
int binarySearch (int a[], int st, int end, int key){
    if(st>end){
        return -1;
    }
    int mid = (st+end)/2;

    if(a[mid]==key){
        return mid;
    }
    if(key< a[mid]){
        return binarySearch(a,st,mid-1,key);
    }
    else{
        return binarySearch(a,mid+1,end,key);
    }
}

```

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 67 45 18
After sorting the elements are : 18 23 45 67 24
Enter key element : 24
The given key element 24 is not found