S.No: 2	Exp. Name: ***Write a Program to Search an element using Binary Search and Recursion***	Date:2025-04-06

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

```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

```c
void read1(int a[],int n){
    printf("Enter %d elements : ",n);
    for(int i=0;i<n;i++){
        scanf("%d",&a[i]);
    }
}
void bubbleSort(int a[],int n){
    for(int i=0; i<n-1;i++){
        for(int j=0;j<n-i-1;j++){
            if(a[j]>a[j+1]){
                int temp=a[j];
                a[j]=a[j+1];
                a[j+1]=temp;
            }
        }
    }
}
void display(int a[],int n){
```

```
    for(int i=0;i<n;i++){
        printf("%d ",a[i]);
    }
    printf("\n");
}
int binarySearch(int a[],int low, int high,int key){
    while(low<=high){
        int mid = (low+high)/2;
        if(a[mid]==key){
            return mid;
        }
        else if(a[mid]<key){
            low = mid + 1;
        }
        else{
            high = mid - 1;
        }
    }
    return -1;
}
```

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