S.No: 2	Exp. Name: ***Write a Program to Search an element using Binary Search and Recursion***	Date:2024-11-21

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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

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

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){
   return low>high?-1:a[(low+high)/2]==key?
```

```
      (low+high)/2:key>a[(low+high)/2]?binarySearch(a, (high+low)/2+1,high,key):binar
ySearch(a,low,(high+low)/2-1,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

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