S.No: 24	Exp. Name: ***Write a Program to Search an element using Binary Search and Recursion***	Date:2023-06-10

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; 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

ID: 224G1A05B6
2022-2026-CSE-B
Srinivasa Ramanujan Institute of Technology

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

ID: 224G1A05B6