S.No: 3	Exp. Name: ***Write a C program to Search a Key element using Binary search Technique***	Date:2023-04-30

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Aim:

Write a program to **search** a key element in the given array of elements using `binary search`.

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 : 3
```

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

```
Enter element for a[0] :
Enter element for a[1] :
Enter element for a[2] :
```

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

```
Enter element for a[0] : 89
Enter element for a[1] : 33
Enter element for a[2] : 56
```

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

```
Enter key element :
```

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

```
Enter key element : 56
```

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

```
After sorting the elements in the array are
Value of a[0] = 33
Value of a[1] = 56
Value of a[2] = 89
The key element 56 is found at the position 1
```

Similarly if the key element is given as **25** for the above one dimensional array elements then the program should print the output as "**The Key element 25 is not found in the array**".

Source Code:

BinarySearch.c

```
#include<stdio.h>
void main() {
   int a[20], i, j, n, key, flag = 0, low, high, mid, temp;
   printf("Enter value of n : ");
   scanf("%d", &n);
   for(i=0;i<n;i++)
   {
```

```
      printf("Enter element for a[%d] : ",i);
      scanf("%d", &a[i]);
   }


   printf("Enter key element : ");
   scanf("%d", &key);
   for(i=0;i<n;i++)
   {
      for(j=i+1;j<n;j++)
      {
         if(a[i]>a[j])
         {
            temp=a[i];
            a[i]=a[j];
            a[j]=temp;
         }
      }
   }
   printf("After sorting the elements in the array are\n");
   for(i=0;i<n;i++)
   {
      printf("Value of a[%d] = %d\n",i,a[i]);
   }
   low = 0;
   high = n-1;
   mid=(low+high/2);
   while(low<=high)
   {
      if(a[mid]<key)
      low=mid+1;
      else if(a[mid]==key)
      {
         flag=1;
         break;
      }
      else
      high=mid-1;
      mid=(low+high)/2;
   }
   if (flag==1 ) {
      printf("The key element %d is found at the position %d\n",key,mid);
   } else {
      printf("The Key element %d is not found in the array\n",key);
   }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter value of n : 3
Enter element for a[0] : 25
Enter element for a[1] : 15

Enter element for a[2] : 23
Enter key element : 45
After sorting the elements in the array are
Value of a[0] = 15
Value of a[1] = 23
Value of a[2] = 25
The Key element 45 is not found in the array

Test Case - 2
User Output
Enter value of n : 2
Enter element for a[0] : 80
Enter element for a[1] : 39
Enter key element : 50
After sorting the elements in the array are
Value of a[0] = 39
Value of a[1] = 80
The Key element 50 is not found in the array

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