S.No: 3	Exp. Name: ***Write a C program to Search a Key element using Binary search Technique***	Date:2023-04-25

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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=0;j<n-i-1;j++)
        {
            if(a[j+1]<a[j])
            {
                temp = a[j];
                a[j] = a[j+1];
                a[j+1] = 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;
    while(low <= high)
    {
        mid = (high+low)/2;
        if(a[mid]==key)
        {
            flag = 1;;
            break;
        }
        else if(a[mid]<key)
        {
            low = mid+1;
        }
        else
        {
            high = mid-1;
        }
    }
    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,mid);
    }
}
```

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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