S.No: 6	Exp. Name: ***Write a C program to Search an element using Binary Search process***	Date:2023-04-08

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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**".

Note: Do use the **printf()** function with a **newline** character (`\n`) at the end.

Source Code:

Program510.c

```
#include<stdio.h>
int main()
{
   int a[20],n,i,lb,ub,mid,pos=-1,key,j,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++)
   {
      temp=a[i];
      j=i-1;
      while((temp<a[j]&&(j>=0)))
      {
         a[j+1]=a[j];
         j--;
      }
      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]);
   }
   lb=0;
   ub=n-1;
   while(lb<=ub)
   {
      mid=(lb+ub)/2;
      if(a[mid]==key)
      {
         pos=mid;
         break;
      }
      else if(a[mid]>key)
      {
         ub=mid-1;
      }
      else
      {
         lb=mid+1;
      }
   }
   if(pos==-1)
   {
      printf("The Key element %d is not found in the array\n",key);
   }
   else
   {
      printf("The key element %d is found at the position %d\n",key,pos);
   }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1

User Output
Enter value of n : 5
Enter element for a[0] : 4
Enter element for a[1] : 8
Enter element for a[2] : 6
Enter element for a[3] : 2
Enter element for a[4] : 1
Enter key element : 8
After sorting the elements in the array are
Value of a[0] = 1
Value of a[1] = 2
Value of a[2] = 4
Value of a[3] = 6
Value of a[4] = 8
The key element 8 is found at the position 4

Test Case - 2
User Output
Enter value of n : 7
Enter element for a[0] : 56
Enter element for a[1] : 89
Enter element for a[2] : 63
Enter element for a[3] : 215
Enter element for a[4] : 325
Enter element for a[5] : 156
Enter element for a[6] : 256
Enter key element : 458
After sorting the elements in the array are
Value of a[0] = 56
Value of a[1] = 63
Value of a[2] = 89
Value of a[3] = 156
Value of a[4] = 215
Value of a[5] = 256
Value of a[6] = 325
The Key element 458 is not found in the array