

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,j,val,t,mid,ub,lb;
    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",&val);
for(i=0;i<n;i++)
{
    for(j=0;j<(n-i-1);j++)
    {
        if(a[j]>a[j+1])
        {
            t=a[j];
            a[j]=a[j+1];
            a[j+1]=t;
        }
    }
}
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(val==a[mid])
    {
        printf("The key element %d is found at the position %d\n",val,mid);
        break;
    }
    else if(val>a[mid])
    {
        lb=mid+1;
    }
    else
    {
        ub=mid-1;
    }
}
if(lb>ub)
{
    printf("The Key element %d is not found in the array\n",val);
}
}

```

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