

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>
#define size 100
int main()
{
    int a[size],n,lb,ub,mid,pos=-1,val,i,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]);
}
for(i=1;i<n;i++)
{
    temp=a[i];
    j=i-1;
    while(j>=0&&a[j]>temp)
    {
        a[j+1]=a[j];
        j--;
    }
    a[j+1]=temp;
}
printf("Enter key element : ");
scanf("%d",&val);
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]==val)
        {
            printf("The key element %d is found at the position %d\n",val,mi
d);
            pos=mid;
            break;
        }
        else if(a[mid]>val)
        {
            ub=mid-1;
        }
        else
        {
            lb=mid+1;
        }
    }
    if(pos==-1)
    {
        printf("The Key element %d is not found in the array",val);

        printf("\n");
    }
}

```

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