# EXPERIMENT-2

# Aim: To find a number in a sorted array of the numbers using binary search.

## Pseudo code

Function binarysearch(arr[], n, key)

s = 0

e = n - 1

while s <= e

mid = (s + e) / 2

if arr[mid] == key

return mid

else if arr[mid] > key

e = mid - 1

else

s = mid + 1

return -1

Input n

Input arr[n]

Input key

Result = binarysearch(arr, n, key)

If Result != -1

Print "Element found at index:", Result

Else

Print "Element not found"

End If

## Source code:

#include<iostream>

using namespace std;

int binarysearch(int arr[],int n,int key){    //    FUNCTION

    int s=0;                                  //      FOR

    int e=n-1;                                //  BINARY SEARCH

    while(s<=e){                              //      USING

        int mid=(s+e)/2;                      //      ARRAYS

        if (arr[mid]==key){

            return mid;

        }

        else if (arr[mid]>key){

            e=mid-1;

        }

        else {

            s=mid+1;

        }

    }

        return -1;

}

int main(){

    int n;

    cin>>n;

    int arr[n];

    for (int i=0;i<n;i++){

        cin>>arr[i];

    }

   int key;

   cin>>key;

   int result = binarysearch(arr,n,key);

   if(result!=-1){

    cout<<"Element found at index:"<<result<<endl;

   }

   else{

    cout<<"Element not found"<<endl;

   }

}

## Output:

1. **5**

**10 20 30 40 50**

**30**

**Element found at index:2**

1. **5**

**10 20 30 40 50**

**50**

**Element found at index:4**

## Learning from experiment

* Taking numbers from the file.
* Binary search is beneficial when we have a large number of inputs.