Experiment -1.2

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Branch: CSE	**Section/Group: 21BCS717(A)**
Semester: 3rd	**Date of Performance: 8/9/22**
Subject Name: Data Structure	**Subject Code:**

Aim of the practical: To apply Linear Search and Binary Search to find the given element.

Objective: To know about Linear Search and Binary Search.

Algorithm:

// Linear Search

Assume A=array, x=value to find

```
1.  Start
2.  Set i = 1
3.  If  i>n then go to step 7
4.  If A[i] = x then go to step 6
5.  Set i = i+1
6.  Go to step 2
7.  Print x found at i and go to step 8
8.  Print element not found
9.  exit
10. Stop
```

// Binary Search

Assume A=Array, lb=lower bound, ub=upper bound,pos =position

```
1.  Start
2.  Bsearch(a, lb, ub, value)
3.  set beg = lower_bound, end = upper_bound, pos = - 1
4.  repeat steps 3 and 4 while beg <=end
5.   set mid = (beg + end)/2
6.   if a[mid] = val
    set pos = mid
    print pos
    go to step 6
    else if a[mid] > val
    set end = mid - 1
    else
    set beg = mid + 1
    [end of if]
    [end of loop]
7.  Step 5: if pos = -1
    print "value is not present in the array"
    [end of if]
8.   exit
9.  Stop
```

Program code:

// Linear search

```
#include <stdio.h>

int search(int arr[], int N, int x)

{

   int i;

   for (i = 0; i < N; i++)

      if (arr[i] == x)
```

```
            return i;
    return -1;
}
int main(void)
{
    printf("Almul Vaishnavi 21BCS7407");
    int arr[] = { 2, 3, 4, 10, 40 };
    int x = 10;
    int N = sizeof(arr) / sizeof(arr[0]);
     int result = search(arr, N, x);
    if (result == -1)
         printf("\nElement is not present in array");
    else
         printf("\nElement is present at index %d", result);
    return 0;
}
```

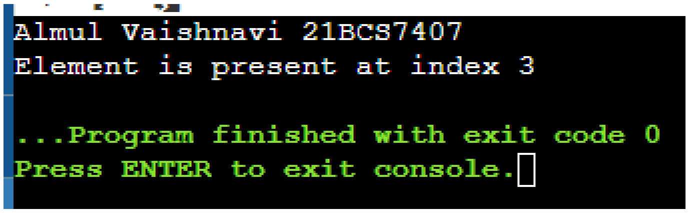
//Binary search

```
#include <stdio.h>
int Bsearch(int a[], int beg, int end, int val)
{
    int mid;
    if(end >= beg)
    {       mid = (beg + end)/2;
        if(a[mid] == val)
        {
            return mid+1;
        }
         else if(a[mid] < val)
        {
```

```
      return Bsearch(a, mid+1, end, val);

    }

    else

    {

      return Bsearch(a, beg, mid-1, val);

    }

  }

  return -1;

}

int main() {

 int a[] = {12,34,22,45,34,56};

 int val = 45;

 int n = sizeof(a) / sizeof(a[0]);

 int res = Bsearch(a, 0, n-1, val);

 printf("Almul Vaishnavi 21BCS7407");

 printf("\nThe elements of the array are :");

 for (int i = 0; i < n; i++)

 printf("%d ", a[i]);

 printf("\nElement to be searched is : %d", val);

 if (res == -1)

 printf("\nElement is not present in the array");

 else

 printf("\nElement is present at %d position of array", res);

 return 0;

}
```

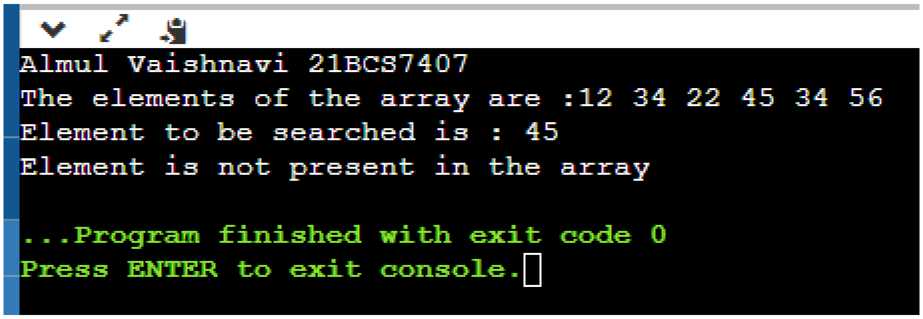
Output:

// Linear Search



```
Almul Vaishnavi 21BCS7407
Element is present at index 3

...Program finished with exit code 0
Press ENTER to exit console.
```

// Binary Search



```
Almul Vaishnavi 21BCS7407
The elements of the array are :12 34 22 45 34 56
Element to be searched is : 45
Element is not present in the array

...Program finished with exit code 0
Press ENTER to exit console.
```

Learning Outcomes:

1. To use linear and binary search