**Ex. No. 10b Binary Search**

**Date:**

**Aim:**

To locate an element in a sorted array using Binary search method

**Algorithm:**

1. Start

2. Read number of array elements, say n

3. Create an array arr consisting n sorted elements

4. Get element, say key to be located

5. Assign 0 to lower and n to upper

6. While (lower < upper)

Determine middle element mid = (upper+lower)/2

If key = arr[mid] then

Print mid

Stop

Else if key > arr[mid] then

lower = mid + 1

else

upper = mid – 1

7. Print "Element not found"

8. Stop

**Program:**

/\* Binary Search on a sorted array \*/

#include <stdio.h>

#include <stdlib.h>

void main()

{

int a[50],i, n, upper, lower, mid, val, found;

system("clear");

printf("Enter array size : ");

scanf("%d", &n);

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

a[i] = 2 \* i;

printf("\n Elements in Sorted Order \n");

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

printf("%4d", a[i]);

printf("\n Enter element to locate : ");

scanf("%d", &val);

upper = n;

lower = 0;

found = -1;

while (lower <= upper)

{

mid = (upper + lower)/2;

if (a[mid] == val)

{

printf("Located at position %d", mid);

found = 1;

break;

}

else if(a[mid] > val)

upper = mid - 1;

else

lower = mid + 1;

}

if (found == -1)

printf("Element not found");

}

**Output:**

**Result:**

Thus an element is located quickly using binary search method.