**Experiment 1**

**Aim:**Implement linear search and binary search on an array.

**Linear Search:**

**Algorithm:**

1. Enter size of the array and initialise a variable ‘ans’ as -1.

2. Enter the array.

3. Enter number to be searched.

4. If an element of the array exists, store the position of element in variable ‘ans’.

5. Print value of ‘ans’.

**Source Code:**

#include <stdio.h>

int main()

{

    int size, search;

    int ans = -1;

    printf("Enter size: ");

    scanf("%d", &size);

    int arr[size];

    printf("Array: ");

    for (int i = 0; i < size; i++)

    {

        scanf("%d", &arr[i]);

    }

    printf("Element to be searched: ");

    scanf("%d", &search);

    for (int i = 0; i < size; i++)

    {

        if (arr[i] == search)

        {

            ans = i;

            break;

        }

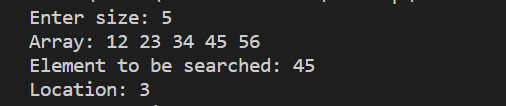
    }

    printf("Location: %d", ans);

    return 0;

}

**Output:**

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**Binary Search:**

**Algorithm:**

1. Enter size of the array and initialise a variable ‘ans’ as -1.

2. Enter the array and the number to be searched.

3.Initialise variable ‘s’ as 0, ‘e’ as size of array-1 and ‘mid’ as (s+e)/2 .

4. Until and unless ‘s’ is less than or equal to ‘e’, following steps are performed.

5. If the value of array element at mid position is equal to element searched, store that position value in ‘ans’.

6. If the value of array element at mid position is more than element searched, then ‘e’ = mid-1.

7. If the value of array element at mid position is less then element searched, then ‘s’ = mid+1.

8. Print the value of ‘ans’.

**Source Code:**

#include <stdio.h>

int main()

{

    int size ,search;

    int ans = -1;

    printf("Size of array: ");

    scanf("%d", &size);

    int arr[size];

    printf("Array: ");

    for (int i = 0; i < size; i++)

    {

        scanf("%d", &arr[i]);

    }

    printf("Element to be searched: ");

    scanf("%d", &search);

    int s = 0;

    int e = size - 1;

    while (s <= e)

    {

        int mid = (s + e) / 2;

        if (arr[mid] == search)

        {

            ans = mid;

            break;

        }

        else if (arr[mid] > search)

        {

            e = mid - 1;

        }

        else

        {

            s = mid + 1;

        }

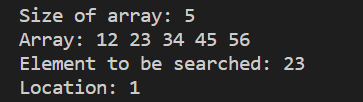
    }

    printf("Location: %d", ans);

    return 0;

}

**Output:**

****