**Aim:** To write a C program that finds the location of a given element in an array using the **Linear Search** technique.

**Apparatus / Software Required:**

* Computer System
* GCC Compiler / Turbo C
* Text Editor or IDE (Code::Blocks, Dev-C++, VS Code, etc.)

**Theory:**

Linear Search is the simplest searching algorithm used to find the position of a target element in a list. It works by sequentially checking each element of the array until the desired element is found or the list ends.

**Steps:**

1. Start from the first element of the array.
2. Compare each element with the target element.
3. If equal, return the position.
4. If not equal, move to the next element.
5. Repeat until the element is found or the list ends.

**Advantages:**

1. Simple and easy to implement.
2. Works on both sorted and unsorted arrays.

**Limitations:**

1. Slow for large datasets.
2. Works in **O(n)** time in the worst case.

**Algorithm:**

1. Start
2. Input the size of the array (n)
3. Input n elements into the array
4. Input the element to search
5. For i = 0 to n-1:
   * If arr[i] == search, print location and stop
6. If element not found, display message
7. Stop

**Program:**

#include <stdio.h> // Include standard input-output header file

int main() { // Start of main function

int arr[100], n, i, search; // Declare variables

// Step 1: Input size of array

printf("Enter the number of elements: "); // Ask user for total elements

scanf("%d", &n); // Read number of elements from user

// Step 2: Input array elements

printf("Enter %d elements:\n", n); // Prompt user to enter elements

for(i = 0; i < n; i++) { // Loop from 0 to n-1

scanf("%d", &arr[i]); // Read each element into array

}

// Step 3: Input element to search

printf("Enter the element to search: "); // Ask user for target element

scanf("%d", &search); // Read target element

// Step 4: Linear Search

for(i = 0; i < n; i++) { // Loop through all elements

if(arr[i] == search) { // If current element matches search

printf("%d found at location %d.\n", search, i + 1); // Print found message (1-based position)

return 0; // Exit program as element is found

}

}

// Step 5: If element is not found

printf("Element not found in the list.\n"); // Print not found message

return 0; // End of program

}

**Sample Output:**

Enter the number of elements: 5

Enter 5 elements:

10

20

30

40

50

Enter the element to search: 30

30 found at location 3.

Enter the number of elements: 4

Enter 4 elements:

5

10

15

20

Enter the element to search: 12

Element not found in the list.

**Conclusion:**

The Linear Search algorithm successfully finds the position of an element in an array by checking elements one by one. It is simple and works for both sorted and unsorted data but is less efficient for large datasets compared to Binary Search.