

Theory: Linear search

🕒 4 minutes 5 / 5 problems solved

Start practicing

3117 users solved this topic. Latest completion was about 12 hours ago.

§1. The linear search algorithm

Linear search (or sequential search) is a simple algorithm for searching an element with a specific value in the array. The algorithm checks each array element until it finds the target value or reaches the array end.

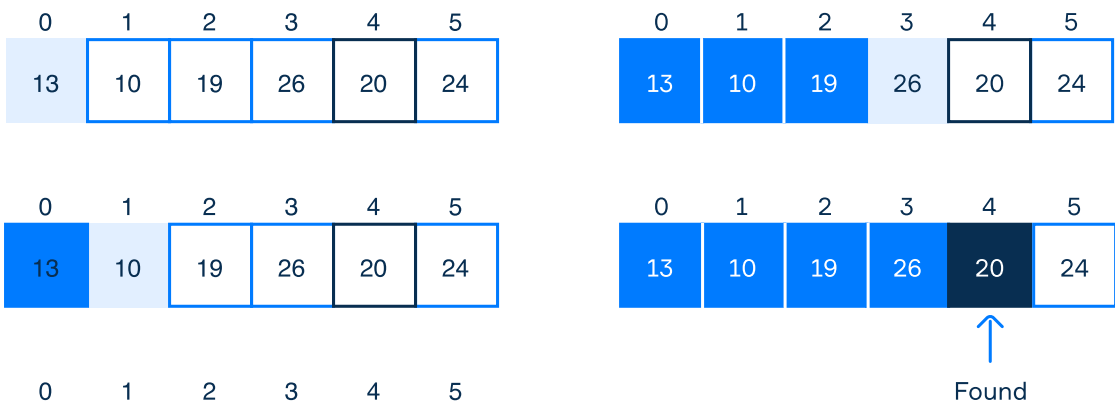
In the worst case, it performs exactly n comparisons where n is the length of the input array. The time complexity is $O(n)$.

§2. Example

Suppose, we have an array of 6 elements:

0	1	2	3	4	5
13	10	19	26	20	24

Our goal is to find the index of an element with the value 20. We will start from the first element with index 0 and compare each array element with the target value until we find the target value.



As you may see, the linear search is a simple algorithm with an important advantage: it can search in unsorted arrays.

§3. Possible modifications

Possible modifications of the linear search algorithm are:

- check whether the array contains an element, return **true** or **false**;
- search for the first or the last occurrence of an element in the array;
- count all occurrences of an element in the array;
- search for all occurrences of an element in the array;
- search for an element in the subarray of the array with the given indices.

Also, the **linear search algorithm** can be used as a subroutine in more complex algorithms. For example, to count all occurrences of all array elements in another array.

If we know that our array is **sorted** (e.g. *in ascending order*), we could modify the linear search algorithm. If the next checked element is greater than the target value, it means we will not find the value in the rest of the array, and the algorithm should stop. In the next topics, we will examine how to make searching in sorted arrays more effective.

[Here is a visualization of the algorithm.](#) To see it, enter the target value and select **Linear Search** at the top of the page.

Current topic:

✓ [Linear search](#) ...

Topic depends on:

✓ [The big O notation](#) ...

Topic is required for:

✓ [Binary search](#) ...

✓ [Jump search](#) ...

[Linear search in Java](#) ...

[Linear search in Python](#) ...

Table of contents:

- [↑ Linear search](#)
- [§1. The linear search algorithm](#)
- [§2. Example](#)
- [§3. Possible modifications](#)
- [Feedback & Comments](#)

229 users liked this theory. 0 didn't like it. What about you?



Start practicing

[Comments \(3\)](#)

[Hints \(0\)](#)

[Useful links \(0\)](#)

[Show discussion](#)