**Two-Pointer Technique**

**What is it?**

* The two-pointer technique sounds just like how its named.
* It's the use of two different pointers to solve a problem involving said indices with the benefit of saving time and space.

*The idea is to iterate two different pointers simultaneously to get the answer faster.*

A picture containing text, clock

Description automatically generated

**How To Use It?**

1. **Identify if the problem requires the two-pointer technique**

**What Data Structures Should We Use It On?**

Contiguous sequences of elements are any collections that can be linearly iterated over:

* Strings
* Arrays
* Linked lists
* Etc.

**Common Questions to Identify**

1. Does the problem request a search of two or more items?

If this is not directly what the question is asking for, can it be reduced to such a task?

1. Should the array be sorted before pointers are initialized?
2. Should pointers be moving at different speeds?
3. Should pointers be updated one at a time or simultaneously?
4. **Identify where to put the pointers**

Should one pointer start at the beginning and one at the end of the collection?

1. **Identify how to move the pointers**

Should the pointers move at the same speed?

Should one pointer move fast, and the other slow?

1. **Identify the terminating condition**

Should we terminate the two-pointer algorithm when the two pointers cross?

**Classic problems:**

1. [Remove Duplicates from Sorted Array](https://leetcode.com/problems/remove-duplicates-from-sorted-array/)
2. [Two Sum II - Input array is sorted](https://leetcode.com/problems/two-sum-ii-input-array-is-sorted/)
3. [Rotate Array](https://leetcode.com/problems/rotate-array/)
4. [Valid Palindrome](https://leetcode.com/problems/valid-palindrome/)
5. [Container With Most Water](https://leetcode.com/problems/container-with-most-water/)
6. [Product of Array Except Self](https://leetcode.com/problems/product-of-array-except-self/)