Arrays

An **array** is a data structure that holds an **ordered collection of elements**. Each position in the array has an **index**, starting with 0.

In a low-level array, you must specify the size of your array when you declare it. Arrays are implemeted by allocating a contiguous chunk of memory large enough to hold that many elements.

C# (beta)

```
// declare an array that holds 10 integers
int[] gasPrices = new int[10];

gasPrices[0] = 346;
gasPrices[1] = 360;
gasPrices[2] = 354;
```

Arrays are efficient for looking up the element at an index, because if you know the address where an array starts in memory, it's simple math to find the address of any index. This gives arrays an $O(1)$ lookup time.

Arrays are the foundation of many other data structures, like dynamic arrays, stacks, and dictionaries .

Some languages, including C#, have dynamic arrays with a few additional features. In C#, we call them "generic lists."

A **dynamic array (/concept/dynamic-array-amortized-analysis)** doesn't require you to specify the length and allows you to seamlessly (although sometimes with time and space costs) insert and delete elements at any index.

In C#, you can simply say:

```
C# (beta)
List<int> gasPrices = new List<int>();

gasPrices.Add(346);
gasPrices.Add(360);
gasPrices.Add(354);
```

Here, the details about the length are abstracted out for you. You can add as many prices as you'd like.

Fun fact: **strings** are almost always implemented as arrays of characters.

See also:

- Dynamic Arrays (/concept/dynamic-array-amortized-analysis)
- Linked Lists (/concept/linked-list)
- Queues (/concept/queue)
- Stacks (/concept/stack)

Array and String Coding Interview Questions

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