Array Cheatsheet

Arrays

Arrays hold values of the same type at contiguous memory locations. In an array, we're usually concerned about two things - the position/index of an element and the element itself.

Advantages

- Store multiple elements of the same type with one single variable name
- Accessing elements is fast (o(1)) as long as you have the index, as opposed to linked lists where you have to traverse from the head (o(n)).

Disadvantages

- Addition and removal of elements in the middle of an array is slow (o(n)) because the remaining elements need to be shifted to accommodate the new/missing element.
  - An exception to this is if the position to be inserted/removed is at the end of the array (o(1)).
- It cannot alter its size after initialization.
  - If an insertion causes the total number of elements to exceed the size, a new array has to be allocated and the existing elements have to be copied over.
  - The act of creating a new array and transferring elements over takes O(n) time.

Common terms

- Subarray - A range of contiguous values within an array.
  - Example: given an array `[2, 3, 6, 1, 5, 4]`, `[3, 6, 1]` is a subarray while `[3, 1, 5]` is not a subarray.
- Subsequence - A sequence that can be derived from the given sequence by deleting some or no elements without changing the order of the remaining elements.
  - Example: given an array `[2, 3, 6, 1, 5, 4]`, `[3, 1, 5]` is a subsequence but `[3, 5, 1]` is not a subsequence.

Things to look out for during interviews

- Clarify if there are duplicate values in the array. Would the presence of duplicate values affect the answer? Does it make the question simpler or harder?

- When using an index to iterate through array elements, be careful not to go out of bounds.
- Be mindful about slicing or concatenating arrays in your code. Typically, slicing and concatenating arrays would take O(n) time. Use start and end indices to demarcate a subarray/range where possible.

Corner Cases

- Empty sequence
- Sequence with 1 or 2 elements
- Sequence with repeated elements
- Duplicated values in the sequence

Time Complexity

Operation	Big-O	Note
Access	O(1)	
Search	O(n)	
Search (sorted array)	O(log(n))	
Insert	O(n)	Insertion would require shifting all the subsequent elements to the right by one and that takes O(n)
Insert (at the end)	O(1)	Special case of insertion where no other element needs to be shifted
Remove	O(n)	Removal would require shifting all the subsequent elements to the left by one and that takes O(n)
Remove (at the end)	O(1)	Special case of removal where no other element needs to be

Resource

Array in Data Structure: What is, Arrays Operations [Examples]

Revision #5
Created 17 December 2024 01:49:58 by victor
Updated 29 December 2024 21:43:53 by victor