Hack the Technical Interview: Algorithms Practice

Presented By

Problem Two Interview Script: Zigzag Arrays

Instructions

1. While the candidate reads the problem and prepares their answer, review this sheet in its entirety.
2. Mark the start and stop time so that you keep track.

Time Allowed: _____

Start Time: _____

Stop Time: _____

Problem Statement

Write a function that takes an array with distinct elements and sorts them in a zig-zag fashion. (ie a < b > c < d > e < f)

```
## input
zigzag([4, 3, 7, 8, 6, 2, 1])

## output (can be different order)
[3, 7, 4, 8, 2, 6, 1]

## input
zigzag([1, 4, 3, 2])

## output (can be different order)
[1, 4, 2, 3]

```

Parameters

- The solution only needs to account for an array (or list) of integers. The list is of arbitrary length. Each item of the array is unique.

Questions the Candidate Might Ask

Note: if the candidate asks a question that isn't answered here, feel free to make a decision and stick to that.

- Should I accept an array of any sortable type? For example, letter and floats?
  Answer: Assume an array of integers.
- Can the same item appear multiple times?
  Answer: Assume each item in the array is unique.

Questions the Interviewer Might Ask

Generic Questions

These are questions you could ask for any code challenge.

- What does this function need to do?
- How would you get started?
- What information do you need to store?

Guiding Questions

These are questions you can use to help the candidate if they get stuck.

- To solve this problem, you need to compare each item in a list to construct a new list. How can you compare each item in a list?

  Answer: Iterating with a loop or with recursion.

- If you need to compare the size of integers, what's a good starting point for array structure?

  Answer: If you're going to need to compare the size of integers, it's easier to start with a sorted array. Note, this leads the person to the less efficient solution.

- Given a list from one of the examples, go through it item by item. At what point do you need to change an item? Can you change the item by using the next item in the list?

  Answer: Once the zig-zag condition is violated by having a sorted subsection, for example [3, 7, 8], the condition can be satisfied by swapping the current item with the next item. In the example, 7 would swap with 8 to give [3, 8, 7] which satisfies the zig-zag condition.

Hints

- Try looping over the array.
- How would you detect where the zig-zag condition is violated while looping?

- Once the zig-zag condition is violated, how do you fix it?

If you give them all these hints and they still don't have a solution, you can start pointing them in the right direction with a line or two of code from one of the solutions below.

Solutions

Solution #1

```
def swap(arr, i, j):
      arr[i], arr[j] = arr[j], arr[i]

def zigzag(arr):
      srt = sorted(arr)
      left = 1
      while left < len(srt)-1:
            swap(srt, left, left + 1)
            left = left + 2
      print(srt)
```

Solution #2 (better)

```
def zigzag(arr, n):
      flag = True
      For i in range(n-1):
            if flag is True:
                  if arr[i] > arr[i+1]:
                        arr[i], arr[i+1] = arr[i+1], arr[i]
            else:
                  if arr[i] < arr[i+1]:
                        arr[i], arr[i+1] = arr[i+1], arr[i]
            flag = bool(1-flag)
      print(arr)

def zigzag(arr):
      zigzag(arr, len(arr))
```