Triplet Sum to Zero

∑ SR Score	404	
⌲ Link	https://www.educative.io/courses/grokking-the-coding-interview/gxk639mrr5r	
🗓 Last Reviewed	@April 3, 2022	
# Time	1	
# Score	2	
≣ DS	`arrays`	
≣ Algo	`sorting` `two pointers`	
⊙ Stated	`medium`	
⊙ Perceived	`medium`	
⊙ List	`TODO`	
☑ Needs Review	☑	
☑ Repeat Offender	☐	
☑ Confident	☐	
∑ C_Date	1	
∑ C_Solution	4	
∑ C_Time	100	
⊙ Frequency		

▼ **Problem Statement**

Problem Statement

Given an array of unsorted numbers, find all **unique triplets in it that add up to zero**.

Example 1:

```
Input: [-3, 0, 1, 2, -1, 1, -2]
Output: [-3, 1, 2], [-2, 0, 2], [-2, 1, 1], [-1, 0, 1]
Explanation: There are four unique triplets whose sum is equal to zero.
```

Example 2:

```
Input: [-5, 2, -1, -2, 3]
Output: [[-5, 2, 3], [-2, -1, 3]]
Explanation: There are two unique triplets whose sum is equal to zero.
```

▼ **Intuition**

- first thing to recognize is that we need to sort the array → allows us to use two pointer approach & effectively reduce the problem to Pair with Target Sum
- next challenge is dealing with the no duplicate rule [i != j, i != k, and j != k, and nums[i] + nums[j] + nums[k] == 0]
  - so first lets deal with i (the main loop pointer):
    - assuming we aren't at the first index, check if i == i - 1; if yes, then i is repeating, so just increment i
  - as for j, run a loop that skips over j (or left) until it's not repeated (arr[left] == arr[left - 1]), making sure that left never crosses right (or k)
  - now you're wondering about k (or right), but we don't need to explicitly create a loop for right bc now that we know left is not repeated, a different right (k) value will be needed to zero out the sum, so the sum </> needed will take care of incrementing the right pointer down!

▼ **Time & Space Considerations**

- time:
  - we have to sort to use two pointers approach, so that's O(nlogn)
  - we also run a loop to iterate over the array, and that's O(n)

- within each main loop, we have another while loop to execute two sum, so that's O(n), leading to $O(n^2)$
  - **therefore, the total time complexity = $O(nlogn) + O(n^2)$**
- space: O(n) (not counting the triplets output array)
  - *most ideal sorting algos take up O(n) space*

▼ **Review Notes**

  ▼ [4/3/22]
  - got the idea of using main array iteration pointer and doing a two sum with that main pointer inverse being the "target"
    - i.e. if main pointer value was -3, then two pointer solution needed to add up to 3 to cancel out and get to 0
  - struggled with the no duplicates req

▼ **Tracking**

Scores

📅 Date	# Time	# Score	Aa Notes
@April 3, 2022	1	2	https://www.notion.so/Triplet-Sum-to-Zero- 1d74b99e1e50407480c726bd66684dcd#af85a9bc057841bd9b937c3820c6ea8d
			Untitled
			Untitled

▼ **Solutions**

```python
# Attempt 1: 4/3/22
# NS
# got the idea of using a regular pointer that iterates thru array and reducing problem to two sum within that pointer
def search_triplets(arr):
    triplets = []
    arr.sort()
    for i in range(len(arr) - 2):
        if i > 0 and arr[i] == arr[i - 1]:
            continue
        needed = -1 * arr[i]
        left, right = i + 1, len(arr) - 1
        while left < right:
            sum = arr[left] + arr[right]
            if sum > needed:
                right -= 1
            elif sum < needed:
                left += 1
            else:
                triplets.append([arr[i], arr[left], arr[right]])
                left += 1
                while arr[left] == arr[left - 1] and left < right:
                    left += 1

    return triplets
```

▼ **Resources**

3Sum - Leetcode 15 - Python
🎓 Get 10% off EducativeIO today ► https://www.educative.io/neetcode🚀
https://neetcode.io/ - A better way to prepare for Coding Interviews🟣 Get 10%
off Alg...
▶️ https://www.youtube.com/watch?v=jzZsG8n2R9A

▼ **GitHub**

GCI-master-list/Pattern 2 - Two Pointers/Triplet Sum to Zero at main · psdev30/GCI-master-list
Contribute to psdev30/GCI-master-list development by creating an account on GitHub.

⬡ https://github.com/psdev30/GCI-master-list/tree/main/Pattern%202%20-%20Two%20Pointers/Triplet%20Sum%20to%20Zero

🤝 1
Contributor ⊙ 0
Issues