Find All Triplets With Zero Sum

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Platform	GeeksForGeeks
difficulty	Easy
tags	Logic
language	C++
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link	https://www.geeksforgeeks.org/problems/find-all-triplets-with-zero-sum/1
Completion	☑

Intuition

The task is to find all unique triplets in the array that sum up to zero. This brute-force approach checks each possible combination of three indices and tests if their sum equals zero.

Approach

1. Use three nested loops to iterate through the array:
    - The outer loop runs from the start to the end of the array, representing the first element of the triplet.
    - The middle loop starts from the next element after the first loop, representing the second element.
    - The inner loop starts from the next element after the middle loop, representing the third element.
2. Check if the sum of the three selected elements is zero.
3. If the condition is met, add the indices of the triplet to the `answer` vector.
4. Return the vector containing all the valid triplets.

Complexity

Time Complexity:

- **O(n^3)**, where `n` is the number of elements in the input array. This approach uses three nested loops, resulting in cubic time complexity.

Space Complexity:

- **O(1)** (ignoring the space used by the output vector). The space required for storing the triplets in the `answer` vector depends on the number of valid triplets found.

Code

```
class Solution {
  public:
    vector<vector<int>> findTriplets(vector<int> &arr) {
        vector<vector<int>> answer;
        for(int i = 0; i < arr.size(); i++) {
            for(int j = i + 1; j < arr.size(); j++) {
                for(int k = j + 1; k < arr.size(); k++) {
                    if(arr[i] + arr[j] + arr[k] == 0)
                        answer.push_back({i, j, k});
                }
            }
        }
        return answer;
    }
};
```