Move All Zeroes To End

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Platform	GeeksForGeeks
difficulty	Easy
tags	Sliding Window
language	C++
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link	https://www.geeksforgeeks.org/problems/move-all-zeroes-to-end-of-array0751/1
Completion	☑

Intuition

The problem is to move all zeros in an array to the end while maintaining the relative order of non-zero elements. The idea is to iterate through the array and "collect" all non-zero elements at the start. By swapping elements, we ensure that non-zero elements retain their order and zeros are pushed to the end.

Approach

1. Initialize two pointers:
   - `i` to iterate through the array.
   - `j` to mark the position where the next non-zero element should be placed.
2. Traverse the array using the `i` pointer:
   - If `arr[i]` is non-zero, swap it with `arr[j]` and increment `j`.
   - If `arr[i]` is zero, do nothing (this automatically moves zeros to the end).
3. This method ensures that all non-zero elements are moved to the front in their original order, and zeros are moved to the back.

Complexity

Time Complexity:

- **O(n)**: The algorithm iterates through the array once, where `n` is the size of the array. Each operation inside the loop (swap) is O(1).

Space Complexity:

- **O(1)**: No extra space is used; all operations are performed in-place.

Code

```
class Solution {
  public:
    void pushZerosToEnd(vector<int>& arr) {
        for(int i = 0, j = 0; i<arr.size(); i++)
            if(arr[i]) swap(arr[i],arr[j++]);
```

```
    }
};
```