

## 283 Move Zeroes

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### Question:

Given an array `nums`, write a function to move all 0's to the end of it while maintaining the relative order of the non-zero elements.

For example, given `nums = [0, 1, 0, 3, 12]`, after calling your function, `nums` should be `[1, 3, 12, 0, 0]`.

### Note:

1. You must do this **in-place** without making a copy of the array.
2. Minimize the total number of operations.

来自 <<https://leetcode.com/problems/move-zeroes/description/>>

给定一个数组 `nums`，编写一个函数将所有 0 移动到它的末尾，同时保持非零元素的相对顺序。  
例如， 定义 `nums = [0, 1, 0, 3, 12]`，调用函数之后， `nums` 应为 `[1, 3, 12, 0, 0]`。

### 注意事项:

1. 必须在原数组上操作，不要为一个新数组分配额外空间。
2. 尽量减少操作总数。

### Solution for Python3:

```
1  class Solution1:
2      def moveZeroes(self, nums):
3          """
4              :type nums: List[int]
5              :rtype: void Do not return anything, modify nums in-place instead.
6          """
7          cnt = 0
8          for i in range(len(nums)):
9              if nums[i]:
10                 nums[cnt] = nums[i]
11                 if i > cnt:
12                     nums[i] = 0
13                 cnt += 1
14
15  class Solution2:
16      def moveZeroes(self, nums):
17          """
18              :type nums: List[int]
19              :rtype: void Do not return anything, modify nums in-place instead.
20          """
21          cnt = 0
22          for i in range(len(nums)):
23              if nums[i]:
24                 nums[cnt] = nums[i]
25                 cnt += 1
26          for i in range(cnt, len(nums)):
27              nums[i] = 0
28              cnt += 1
29
30  class Solution3:
31      def moveZeroes(self, nums):
32          """
```

```

33         :type nums: List[int]
34         :rtype: void Do not return anything, modify nums in-place instead.
35         """
36         cnt = 0
37         for i in range(len(nums)):
38             if nums[i]:
39                 nums[cnt], nums[i] = nums[i], nums[cnt]
40                 cnt += 1

```

## Solution for C++:

```

1  class Solution1 {
2  public:
3      void moveZeroes(vector<int>& nums) {
4          int cnt = 0;
5          for (int i = 0; i < nums.size(); i++) {
6              if (nums[i]) {
7                  nums[cnt] = nums[i];
8                  if (i > cnt) {
9                      nums[i] = 0;
10                 }
11                 cnt++;
12             }
13         }
14     }
15 };
16
17 class Solution2 {
18 public:
19     void moveZeroes(vector<int>& nums) {
20         int cnt = 0;
21         for (int i = 0; i < nums.size(); i++) {
22             if (nums[i])
23                 nums[cnt++] = nums[i];
24         }
25         for (int i = cnt; i < nums.size(); i++) {
26             nums[i] = 0;
27         }
28     }
29 };
30
31 class Solution3 {
32 public:
33     void moveZeroes(vector<int>& nums) {
34         for (int cnt = 0, i = 0; i < nums.size(); i++) {
35             if (nums[i]) {
36                 swap(nums[cnt++], nums[i]);
37             }
38         }
39     }
40 };

```