

88. Merge Sorted Array

You are given two integer arrays `nums1` and `nums2`, sorted in **non-decreasing order**, and two integers `m` and `n`, representing the number of elements in `nums1` and `nums2` respectively.

Merge `nums1` and `nums2` into a single array sorted in **non-decreasing order**.

The final sorted array should not be returned by the function, but instead be *stored inside the array* `nums1`. To accommodate this, `nums1` has a length of `m + n`, where the first `m` elements denote the elements that should be merged, and the last `n` elements are set to 0 and should be ignored. `nums2` has a length of `n`.

Example 1:

Input: `nums1 = [1,2,3,0,0,0]`, `m = 3`, `nums2 = [2,5,6]`, `n = 3`

Output: `[1,2,2,3,5,6]`

Explanation: The arrays we are merging are `[1,2,3]` and `[2,5,6]`.

The result of the merge is `[1,2,2,3,5,6]` with the underlined elements coming from `nums1`.

Example 2:

Input: `nums1 = [1]`, `m = 1`, `nums2 = []`, `n = 0`

Output: `[1]`

Explanation: The arrays we are merging are `[1]` and `[]`.

The result of the merge is `[1]`.

Example 3:

Input: `nums1 = [0]`, `m = 0`, `nums2 = [1]`, `n = 1`

Output: `[1]`

Explanation: The arrays we are merging are `[]` and `[1]`.

The result of the merge is [1].

Note that because $m = 0$, there are no elements in `nums1`. The 0 is only there to ensure the merge result can fit in `nums1`.

Constraints:

- `nums1.length == m + n`
- `nums2.length == n`
- $0 \leq m, n \leq 200$
- $1 \leq m + n \leq 200$
- $-10^9 \leq \text{nums1}[i], \text{nums2}[j] \leq 10^9$

Follow up: Can you come up with an algorithm that runs in $O(m + n)$ time?