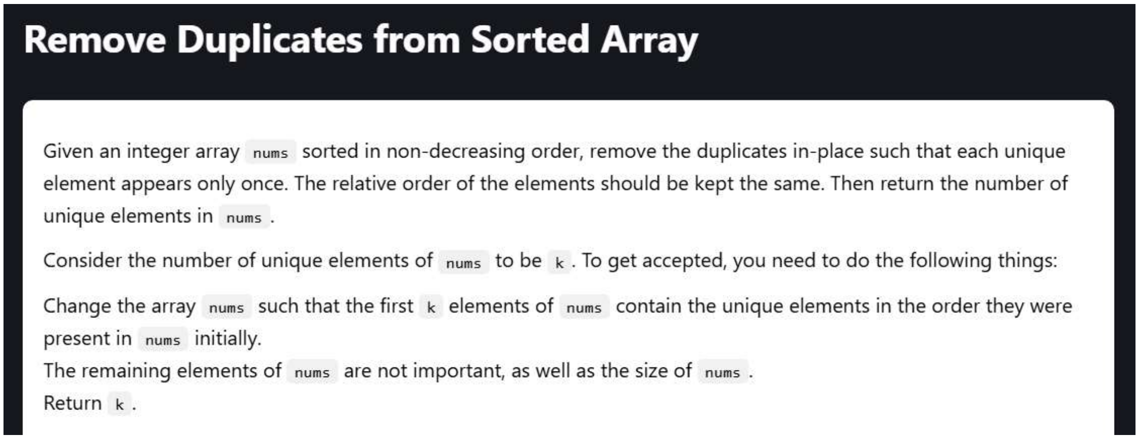
Removes Duplicate

Take a hole variable and try to fill the unique element over there and once done increase the hole variable.



Remove Duplicates from Sorted Array

Given an integer array `nums` sorted in non-decreasing order, remove the duplicates in-place such that each unique element appears only once. The relative order of the elements should be kept the same. Then return the number of unique elements in `nums`.

Consider the number of unique elements of `nums` to be `k`. To get accepted, you need to do the following things:

Change the array `nums` such that the first `k` elements of `nums` contain the unique elements in the order they were present in `nums` initially.
The remaining elements of `nums` are not important, as well as the size of `nums`.
Return `k`.

Examples

Example 1:

```
Input: nums = [1,1,2]
Output: 2, nums = [1,2,_]
Explanation: Your function should return k = 2, with the first two elements of nums being 1 and 2
respectively.
It does not matter what you leave beyond the returned k (hence they are underscores).
```

Example 2:

```
Input: nums = [0,0,1,1,1,2,2,3,3,4]
Output: 5, nums = [0,1,2,3,4,_,_,_,_,_]
Explanation: Your function should return k = 5, with the first five elements of nums being 0, 1, 2, 3, and
4 respectively.
It does not matter what you leave beyond the returned k (hence they are underscores).
```

Constraints:

1 ≤ `nums.length` ≤ 3 * 10^4
-100 ≤ `nums[i]` ≤ 100
`nums` is sorted in non-decreasing order.

Important Points

Non-decreasing order:

The array is sorted such that elements can stay the same or increase: `nums[i] <= nums[i+1]`.

Examples:

Valid: `[1, 1, 2, 3, 3, 5]`

Invalid: `[3, 2, 1]` (this is decreasing)

In-place:

You must modify the given `nums` array itself.

You are **not allowed** to use extra arrays for storing the result.

Approach

`x = 0`: Pointer to track the last unique element's position.

Loop through the array from `i = 0` to `nums.length`.

Compare `nums[i] > nums[x]`:

If true (new unique value), increment `x` and update `nums[x] = nums[i]`.

This shifts the unique value forward in the array.

At the end, `x + 1` gives the count of unique elements.

Time Complexity (TC):

The function uses a single loop that iterates through the entire array once.

Each iteration performs constant-time operations (comparisons and assignments).

Time Complexity = O(n), where `n = nums.length`.

Space Complexity (SC):

The function modifies the array **in-place**.

Uses only a few extra variables: `x` and `i`.

Space Complexity = O(1) (constant extra space).

Dry Run

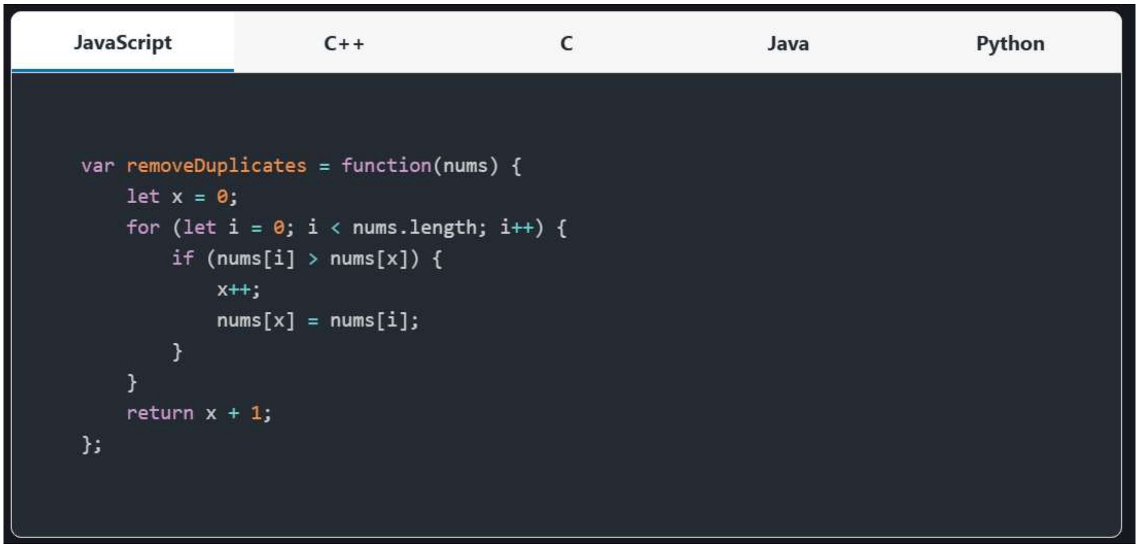
```
Input: [1, 1, 2, 3, 3, 5]

Initial state:
x = 0

i = 0: nums[i] = 1, nums[x] = 1 → NOT greater → skip
i = 1: nums[i] = 1, nums[x] = 1 → NOT greater → skip
i = 2: nums[i] = 2, nums[x] = 1 → GREATER → x=1, nums[1] = 2
i = 3: nums[i] = 3, nums[x] = 2 → GREATER → x=2, nums[2] = 3
i = 4: nums[i] = 3, nums[x] = 3 → NOT greater → skip
i = 5: nums[i] = 5, nums[x] = 3 → GREATER → x=3, nums[3] = 5

Final array: [1, 2, 3, 5, 3, 5]
Unique count: x + 1 = 4
```

Output: `4` (First 4 elements are unique: [1, 2, 3, 5])



```
var removeDuplicates = function(nums) {
    let x = 0;
    for (let i = 0; i < nums.length; i++) {
        if (nums[i] > nums[x]) {
            x++;
            nums[x] = nums[i];
        }
    }
    return x + 1;
};
```