

41. First Missing Positive

Description

Given an unsorted integer array `nums`, return the smallest missing positive integer.

You must implement an algorithm that runs in $O(n)$ time and uses $O(1)$ auxiliary space.

Example 1:

Input: `nums = [1,2,0]`
Output: 3
Explanation: The numbers in the range [1,2] are all in the array.

Example 2:

Input: `nums = [3,4,-1,1]`
Output: 2
Explanation: 1 is in the array but 2 is missing.

Example 3:

Input: `nums = [7,8,9,11,12]`
Output: 1
Explanation: The smallest positive integer 1 is missing.

Constraints:

- $1 \leq \text{nums.length} \leq 10^5$
- $-2^{31} \leq \text{nums}[i] \leq 2^{31} - 1$

