

## 41. First Missing Positive

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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 constant extra 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:

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