# First Missing Positive

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:**

- $1 <= nums.length <= 10^5$
- $-2^{31} <= nums[i] <= 2^{31} - 1$