
Problem Statement:

Given an integer list *nums*, determine whether any integer appears at least twice in the list.

Solution 1

```python
def contains_duplicate(nums: list[int]) -> bool:
    seen = set()
    for num in nums:
        if num in seen: return True
        seen.add(num)
    return False
```

Step-by-Step Breakdown

1. **Input:**
    - nums = [1, 2, 3, 4, 5, 6, 7, 1]
2. **Using a Set:**
    - Initialize an empty set called seen.
        - Recall that a set is a unique collection of an object's elements.
    - Iterate through the list nums.
    - Check if the current integer num already exists in seen.
        - If true, return True (duplicate found).
        - If false, add num to seen.
3. **Output:** True because 1 is repeated.
4. **Efficiency:**
    - **Time Complexity:** O(n)
    - **Space Complexity:** O(n)

Solution 2 – Simple One Line Solution

```python
def contains_duplicate_one_line(nums: list[int]) -> bool:
    return (len(set) < len(nums))
```

Step-by-Step Breakdown

1. **Input:**

- nums = [1, 2, 3, 4, 5, 6, 7, 1]

2. **Using a Set:**
    - Initialize an empty set called seen.
        - Recall that a set is a unique collection of an object's elements.
    - Return the result of comparing the length of the set to the length of the array.
3. **Output:** True because the len of the set is less than the length of the array, which indicates that a number is repeated.
4. **Efficiency:**
    - **Time Complexity:** O(n)
    - **Space Complexity:** O(n)

Comparison

Aspect	Solution One
Efficiency	O(n)
Memory Usage	
Ease of Implementation	
Scalability	

Problem Statement

Blind Solution

Step-by-Step Breakdown

Solution Code

```
# O(n) time complexity - using set for constant time lookups
def contains_duplicate(nums: list[int]) -> bool:
    seen = set()
    for num in nums:
        if num in seen:
            return True
        seen.add(num)
    return False
```

Optimized One-Liner Solution

```
# One-liner using set and list length comparison
# Clever check: If a set has fewer elements than the list, duplicates exist.
def contains_duplicate_one_line(nums: list[int]) -> bool:
    return len(set(nums)) < len(nums)
```

Efficiency

Aspect	**Blind Solution**	**One-Liner Solution**
Efficiency	O(n)	O(n)
Memory Usage	Moderate	Moderate
Ease of Implementation	Simple	Very Simple
Scalability	Good	Good