Problem 457: Circular Array Loop

Problem Information

Difficulty: Medium
Acceptance Rate: 36.43%
Paid Only: No
Tags: Array, Hash Table, Two Pointers

Problem Description

You are playing a game involving a **circular** array of non-zero integers `nums`. Each `nums[i]` denotes the number of indices forward/backward you must move if you are located at index `i`:

* If `nums[i]` is positive, move `nums[i]` steps **forward** , and * If `nums[i]` is negative, move `abs(nums[i])` steps **backward**.

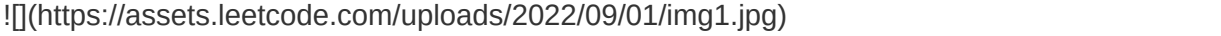
Since the array is **circular** , you may assume that moving forward from the last element puts you on the first element, and moving backwards from the first element puts you on the last element.

A **cycle** in the array consists of a sequence of indices `seq` of length `k` where:

* Following the movement rules above results in the repeating index sequence `seq[0] -> seq[1] -> ... -> seq[k - 1] -> seq[0] -> ...` * Every `nums[seq[j]]` is either **all positive** or **all negative**. * `k > 1`

Return `true` _if there is a**cycle** in _`nums` _, or_`false` _otherwise_.

Example 1:



Input: nums = [2,-1,1,2,2] **Output:** true **Explanation:** The graph shows how the indices are connected. White nodes are jumping forward, while red is jumping backward. We can see the cycle 0 --> 2 --> 3 --> 0 --> ..., and all of its nodes are white (jumping in the same

direction).

Example 2:

Input: nums = [-1,-2,-3,-4,-5,6] **Output:** false **Explanation:** The graph shows how the indices are connected. White nodes are jumping forward, while red is jumping backward. The only cycle is of size 1, so we return false.

Example 3:

Input: nums = [1,-1,5,1,4] **Output:** true **Explanation:** The graph shows how the indices are connected. White nodes are jumping forward, while red is jumping backward. We can see the cycle 0 --> 1 --> 0 --> ..., and while it is of size > 1, it has a node jumping forward and a node jumping backward, so **it is not a cycle**. We can see the cycle 3 --> 4 --> 3 --> ..., and all of its nodes are white (jumping in the same direction).

Constraints:

* `1 <= nums.length <= 5000` * `-1000 <= nums[i] <= 1000` * `nums[i] != 0`

Follow up: Could you solve it in `O(n)` time complexity and `O(1)` extra space complexity?

Code Snippets

C++:

```
class Solution {
public:
bool circularArrayLoop(vector<int>& nums) {

}
};
```

Java:

```
class Solution {
public boolean circularArrayLoop(int[] nums) {

}
}
```

Python3:

```
class Solution:
def circularArrayLoop(self, nums: List[int]) -> bool:
```