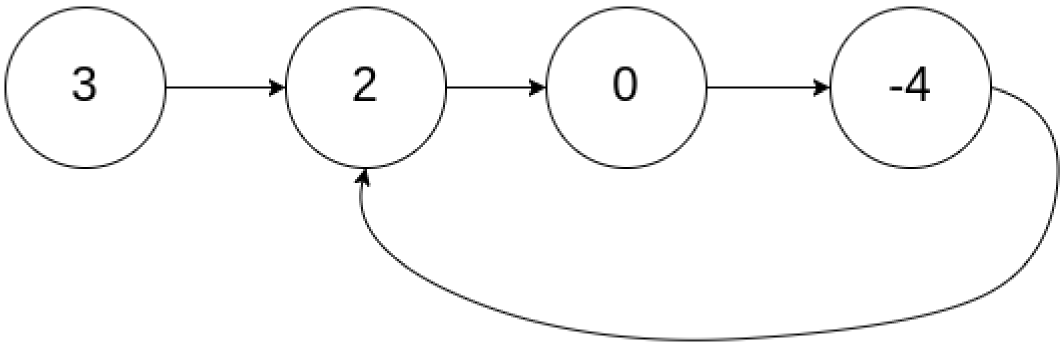
142. Linked List Cycle II

Given the `head` of a linked list, return *the node where the cycle begins. If there is no cycle, return* `null`.

There is a cycle in a linked list if there is some node in the list that can be reached again by continuously following the `next` pointer. Internally, `pos` is used to denote the index of the node that tail's `next` pointer is connected to (**0-indexed**). It is `-1` if there is no cycle. **Note that** `pos` **is not passed as a parameter**.

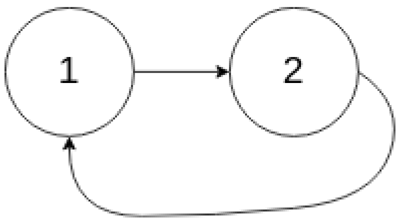
Do not modify the linked list.

Example 1:



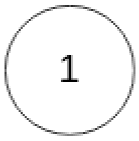
```
Input: head = [3,2,0,-4], pos = 1
Output: tail connects to node index 1
Explanation: There is a cycle in the linked list, where tail connects to the
second node.
```

Example 2:



```
Input: head = [1,2], pos = 0
Output: tail connects to node index 0
Explanation: There is a cycle in the linked list, where tail connects to the
first node.
```

Example 3:



```
Input: head = [1], pos = -1
Output: no cycle
Explanation: There is no cycle in the linked list.
```

Constraints:

- The number of the nodes in the list is in the range `[0, 10<sup>4</sup>]`.
- `-10<sup>5</sup> <= Node.val <= 10<sup>5</sup>`
- `pos` is `-1` or a **valid index** in the linked-list.

Follow up: Can you solve it using `O(1)` (i.e. constant) memory?

```
# Definition for singly-linked list.
# class ListNode:
#     def __init__(self, x):
#         self.val = x
#         self.next = None

class Solution:
    def detectCycle(self, head: ListNode) -> ListNode:
        if head is None or head.next is None:
            return None
        slow = head
        fast = head
        while fast is not None and fast.next is not None:
            slow = slow.next
            fast = fast.next.next
            if slow==fast:
                break
        if slow!=fast:
            return None
        slow = head
        while slow!=fast:
            slow = slow.next
            fast = fast.next
        # curr = head
        # pos = 0
        # while curr!=slow:
        #     curr = curr.next
        #     pos+=1
        # return pos
        return slow
```