

Problem 2130: Maximum Twin Sum of a Linked List

Problem Information

Difficulty: Medium

Acceptance Rate: 81.58%

Paid Only: No

Tags: Linked List, Two Pointers, Stack

Problem Description

In a linked list of size `n`, where `n` is **even** , the `ith` node (**0-indexed**) of the linked list is known as the **twin** of the `(n-1-i)th` node, if `0 <= i <= (n / 2) - 1`.

* For example, if `n = 4` , then node `0` is the twin of node `3` , and node `1` is the twin of node `2` . These are the only nodes with twins for `n = 4` .

The **twin sum** is defined as the sum of a node and its twin.

Given the `head` of a linked list with even length, return _the**maximum twin sum** of the linked list_.

Example 1:

Input: head = [5,4,2,1] **Output:** 6 **Explanation:** Nodes 0 and 1 are the twins of nodes 3 and 2, respectively. All have twin sum = 6. There are no other nodes with twins in the linked list. Thus, the maximum twin sum of the linked list is 6.

Example 2:

Input: head = [4,2,2,3] **Output:** 7 **Explanation:** The nodes with twins present in this linked list are: - Node 0 is the twin of node 3 having a twin sum of $4 + 3 = 7$. - Node 1 is the twin of node 2 having a twin sum of $2 + 2 = 4$. Thus, the maximum twin sum of the linked list is $\max(7, 4) = 7$.

Example 3:

Input: head = [1,100000] **Output:** 100001 **Explanation:** There is only one node with a twin in the linked list having twin sum of $1 + 100000 = 100001$.

Constraints:

* The number of nodes in the list is an **even** integer in the range $[2, 105]$. * $1 \leq \text{Node.val} \leq 105$

Code Snippets

C++:

```
/*
 * Definition for singly-linked list.
 * struct ListNode {
 *     int val;
 *     ListNode *next;
 *     ListNode() : val(0), next(nullptr) {}
 *     ListNode(int x) : val(x), next(nullptr) {}
 *     ListNode(int x, ListNode *next) : val(x), next(next) {}
 * };
 */
class Solution {
public:
    int pairSum(ListNode* head) {
        }

    };
}
```

Java:

```
/**
 * Definition for singly-linked list.
 * public class ListNode {
 *     int val;
 *     ListNode next;
 *     ListNode() {}
 *     ListNode(int val) { this.val = val; }
 *     ListNode(int val, ListNode next) { this.val = val; this.next = next; }
 * }
 */
class Solution {
    public int pairSum(ListNode head) {
        ...
    }
}
```

Python3:

```
# Definition for singly-linked list.
# class ListNode:
#     def __init__(self, val=0, next=None):
#         self.val = val
#         self.next = next
class Solution:
    def pairSum(self, head: Optional[ListNode]) -> int:
```