

376. Wiggle Subsequence

Difficulty : Medium

<https://leetcode.com/problems/wiggle-subsequence>

A **wiggle sequence** is a sequence where the differences between successive numbers strictly alternate between positive and negative. The first difference (if one exists) may be either positive or negative. A sequence with one element and a sequence with two non-equal elements are trivially wiggle sequences.

- For example, [1, 7, 4, 9, 2, 5] is a **wiggle sequence** because the differences (6, -3, 5, -7, 3) alternate between positive and negative.
- In contrast, [1, 4, 7, 2, 5] and [1, 7, 4, 5, 5] are not wiggle sequences. The first is not because its first two differences are positive, and the second is not because its last difference is zero.

A **subsequence** is obtained by deleting some elements (possibly zero) from the original sequence, leaving the remaining elements in their original order.

Given an integer array `nums`, return *the length of the longest **wiggle subsequence** of `nums`*.

Example 1:

Input: `nums = [1,7,4,9,2,5]`

Output: 6

Explanation: The entire sequence is a wiggle sequence with differences (6, -3, 5, -7, 3).

Example 2:

Input: `nums = [1,17,5,10,13,15,10,5,16,8]`

Output: 7

Explanation: There are several subsequences that achieve this length.

One is [1, 17, 10, 13, 10, 16, 8] with differences (16, -7, 3, -3, 6, -8).

Example 3:

Input: `nums = [1,2,3,4,5,6,7,8,9]`

Output: 2

Constraints:

- $1 \leq \text{nums.length} \leq 1000$
- $0 \leq \text{nums}[i] \leq 1000$

Follow up: Could you solve this in $O(n)$ time?