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Statistics   Problem Statement

Problem Statement for ZigZag

Problem Statement

A sequence of numbers is called a *zig-zag sequence* if 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 fewer than two elements is trivially a zig-zag sequence.

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

Given a sequence of integers, **sequence**, return the length of the longest subsequence of **sequence** that is a zig-zag sequence. A subsequence is obtained by deleting some number of elements (possibly zero) from the original sequence, leaving the remaining elements in their original order.

Definition

```
Class:          ZigZag
Method:         longestZigZag
Parameters:     int[]
Returns:        int
Method signature:int longestZigZag(int[] sequence)
(be sure your method is public)
```

Constraints

- **sequence** contains between 1 and 50 elements, inclusive.
- Each element of **sequence** is between 1 and 1000, inclusive.

Examples

```
0)
    { 1, 7, 4, 9, 2, 5 }
    Returns: 6
    The entire sequence is a zig-zag sequence.
1)
    { 1, 17, 5, 10, 13, 15, 10, 5, 16, 8 }
    Returns: 7
    There are several subsequences that achieve this length. One is 1,17,10,13,10,16,8.
2)
    { 44 }
    Returns: 1
3)
    { 1, 2, 3, 4, 5, 6, 7, 8, 9 }
    Returns: 2
4)
    { 70, 55, 13, 2, 99, 2, 80, 80, 80, 80, 100, 19, 7, 5, 5, 5, 1000, 32, 32 }
    Returns: 8
5)
    { 374, 40, 854, 203, 203, 156, 362, 279, 812, 955,
    600, 947, 978, 46, 100, 953, 670, 862, 568, 188,
    67, 669, 810, 704, 52, 861, 49, 640, 370, 908,
    477, 245, 413, 109, 659, 401, 483, 308, 609, 120,
    249, 22, 176, 279, 23, 22, 617, 462, 459, 244 }
    Returns: 36
```

This problem was used for:
    TopCoder Collegiate Challenge Semifinal Round 3 - Division I, Level One

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