H. Vertical Paths Problem

Time Limit: 3 seconds

Problem description

Given an array of integers, we want to determine the minimum number of vertical paths required such that:

Each vertical path starts and ends at array indices i and j respectively ($i \leq j$).

For a vertical path to be valid:

- All the integers between i and j (inclusive) must be strictly increasing or strictly decreasing.
- There must be a change in direction (from increasing to decreasing or vice-versa) after the vertical path ends.

The task is to determine the minimum number of such vertical paths.

Input:

The first line contains an integer n ($1 \leq n \leq 10^5$) - the length of the array.

The next line contains n integers a_i ($1 \leq a_i \leq 10^9$) - the elements of the array.

Output:

Print a single integer - the minimum number of vertical paths.

Example:

Case	Input	Output
1	4 1 2 1 2	2
2	5 1 2 3 4 5	1
3	7 1 2 3 1 1 2 3	3
4	0	0
5	1 2	1