

PROBLEM 5

Composing Pyramids

Input File: compin.txt**Output File:** compout.txt**Time and Memory Limits:** 1 second, 1 GB

The great composer Shtack von Treap has just written his *magnum opus*: *The one-fingered pianist*. Von Treap's piano has 100 000 keys, numbered 1 to 100 000 from left to right (it is a large piano!). His *magnum opus* requires you to press N keys in sequence. The i th key in the sequence is P_i .

As beautiful as von Treap's composition is, you are not skilled enough to play it. As a novice musician, you can only play *musical pyramids*.

A musical pyramid is a sequence of ascending consecutive keys up to the middle of the sequence. From there, it descends one key at a time, finishing on the same key it started. A musical pyramid **must have an odd number of keys**.

For example, $[1, 2, 3, 2, 1]$, $[3, 4, 3]$, $[100, 101, 100]$ and $[7]$ are all musical pyramids.

The following are *not* musical pyramids:

- $[2, 2]$ and $[5, 6, 6, 5]$ since they do not have an odd number of keys.
- $[1, 3, 5, 3, 1]$ since the keys are not consecutive (ascending or descending).
- $[1, 2, 3, 4, 3]$ since the sequence does not stop ascending and start descending precisely in the middle. It also does not finish on the same key it started.

What is the minimum number of keys you need to remove from the sequence to form a musical pyramid?

Input

- The first line of input contains the integer N .
- The second line of input contains N integers describing the composition. The i th of these is P_i .

Output

Your program must output one integer: the minimum number of keys you need to remove from the sequence to form a musical pyramid.

Sample Input 1

6
2 1 3 4 2 1

Sample Input 2

5
10 11 12 11 10

Sample Input 3

4
8 3 5 7

Sample Output 1

3

Sample Output 2

0

Sample Output 3

3

Explanation

In the first sample case, you can remove the second, fourth, and sixth keys leaving $[2, 3, 2]$.

In the second sample case, you do not need to remove any keys.

In the third sample case, you can remove the second, third, and fourth keys leaving $[8]$.

Subtasks & Constraints

For all subtasks:

- $2 \leq N \leq 100\,000$.
- $1 \leq P_i \leq 100\,000$ for all i .

Additionally:

- For Subtask 1 (10 marks), $N \leq 100$ and $P_i \leq 10$ for all i .
- For Subtask 2 (25 marks), $N \leq 1000$.
- For Subtask 3 (35 marks), the largest musical pyramid you can be left with will begin (and end) with key 1.
- For Subtask 4 (20 marks), N is odd, $P_i \leq (N + 1)/2$ for all i , and the first $(N + 1)/2$ keys will be $1, 2, 3, \dots, (N + 1)/2$.
- For Subtask 5 (10 marks), no special constraints apply.