Swimming Pool (`swimmingpool`)

To keep in shape after the first lockdown, Luca decided to sign up at a local swimming pool. Being a novice, he opted for a course where a professional trainer supervises a number of athletes to give advice while they do their lengths.
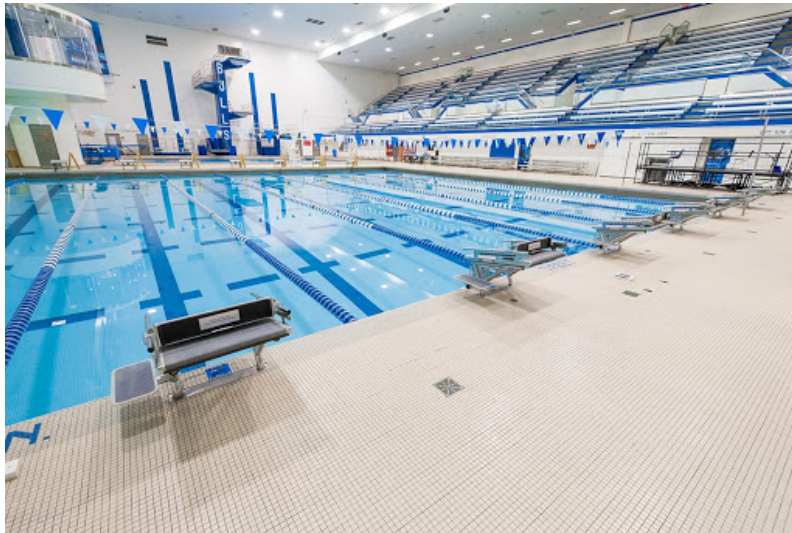

Figure 1: Starting blocks at a swimming pool.

Luca, however, couldn't help to notice that the position of the trainer is suboptimal and she has to continuously shout to be heard by everybody, even before the first dive.

The N athletes are in fact starting at different positions P_i (from 0 to $N-1$), seen from left to right and measured in centimeters from the left wall of the pool. The trainer **always** chooses to stay exactly behind one of them, i.e. she selects a position P_t that coincides with that of one of the athletes. In this way, she is exactly 0 centimeters away from one athlete, but potentially very distant from some of them.

We call D the distance to the furthest athlete: assuming that the trainer chooses wisely the position in which to stay in order to minimize the distance and save her voice, what is the best value of D she can achieve?

> ☞ Among the attachments of this task you may find a template file `swimmingpool.*` with a sample incomplete implementation.

Input

The first line contains the only integer N. The second line contains N integers P_i.

Output

You need to write a single line with an integer D: the minimum distance to the furthest athlete the trainer can achieve staying in the best position.

Constraints

- $2 \leq N \leq 10\,000$.
- $0 \leq P_i \leq 1\,000\,000$ for each $i = 0 \ldots N - 1$.
- $P_i < P_{i+1}$ for each $i = 0 \ldots N - 2$: positions are given in order and each athlete occupies a different position.

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points)   Examples.

– **Subtask 2** (20 points) $N \leq 3$.

– **Subtask 3** (30 points) $N \leq 500$.

– **Subtask 4** (50 points)   No additional limitations.

Examples

input	output
4 10 12 20 60	40
7 100 200 300 400 500 600 700	300

Explanation

In the **first sample case**, the best position for the trainer is at $P_2 = 20$: in that case, the furthest athlete is at $P_3 = 60$.

In the **second sample case**, the best position for the trainer is at $P_3 = 400$: in that case, she has two atheltes at distance 300.