Problem C. Cows

Time limit: 4 seconds
Memory limit: 1024 megabytes

A long pasture is divided into n segments numbered consecutively from 1 to n. The initial height of the grass in the i-th segment is h_i. There is one cow grazing[1] in each segment. The segments are separated by fences. The cows cannot move between segments, but they can stretch their heads over the fence to eat grass from an adjacent segment (i and $i+1$ are adjacent for every i from 1 to $n-1$).

Each minute, each cow eats grass from one chosen segment:

- If there is still grass in her own segment ($h_i > 0$), the cow always chooses her own segment.
- Otherwise, the cow chooses one of the adjacent segments that still has grass.
- The cow does nothing if there is no grass in her segment and the adjacent segments.

If x cows eat grass from the same segment, they reduce it by x in one minute; though the grass height cannot fall below zero. So after a minute we have $h_i := \max(0, h_i - x)$.

The cows cooperate to eat all the grass from the pasture as quickly as possible. After how many minutes can they succeed?

Input

The first line contains an integer n ($1 \le n \le 200\,000$) denoting the number of segments in the pasture.

The second line contains n integers $h_1, h_2, \ldots, h_n$ ($0 \le h_i \le 10^9$) denoting the initial heights of grass in the consecutive segments. At least one of the values h_i is positive.

Output

Output one integer – the minimum time required to eat all the grass, in minutes.

Examples

standard input	standard output
5 5 4 0 4 6	4
3 1 4 6	5

Note

In the first example test the optimal strategy is as follows:

- $[5, 4, 0, 4, 6]$ – Cow 3 chooses the adjacent segment 4. The other cows eat in their own segments.
- $[4, 3, 0, 2, 5]$ – Cow 3 chooses segment 4.
- $[3, 2, 0, 0, 4]$ – Cow 3 chooses segment 2, and cow 4 chooses segment 5.
- $[2, 0, 0, 0, 2]$ – Cow 3 does nothing; cow 2 chooses segment 1; cow 4 chooses segment 5.
- $[0, 0, 0, 0, 0]$ – The cows have eaten all the grass in 4 minutes.

In the second example test the cows never have a choice. The process must proceed as follows:

$$[1, 4, 6] \to [0, 3, 5] \to [0, 1, 4] \to [0, 0, 3] \to [0, 0, 1] \to [0, 0, 0]$$

[1] *To graze* is a verb used for animals eating plants, e.g. cows and sheep eating grass in a field.