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Growing Vegetables is Fun 4

Bitaro likes gardening. He is now growing plants called Biba-herbs in the garden. There are N Biba-herbs in the garden, planted in a line from the west to the east. The Biba-herbs are numbered from 1 to N from the west to the east. Now, the height of the Biba-herb i ($1 \leq i \leq N$) is A_i .

Due to the breed improvement, if Bitaro waters a Biba-herb once, then its height increases by 1. Since he wants to decorate the garden, he will water the Biba-herbs several times so that the following condition is satisfied.

- After Bitaro finishes watering, let B_i be the height of the Biba-herb i . Then, there exists an integer k ($1 \leq k \leq N$) such that $B_j < B_{j+1}$ holds for every $1 \leq j \leq k - 1$, and $B_j > B_{j+1}$ holds for every $k \leq j \leq N - 1$.

However, Bitaro is not good at watering. When he waters Biba-herbs, he can only water consecutive Biba-herbs in an interval. In other words, he chooses integers L and R ($1 \leq L \leq R \leq N$) and waters the Biba-herbs $L, L + 1, \dots, R$.

Bitaro wants to minimize the number of times of watering.

Write a program which, given the number of Biba-herbs and their current heights, calculates the minimum number of times of watering so that the above condition is satisfied.

Input

Read the following data from the standard input. Given values are all integers.

N
 $A_1 \cdots A_N$

Output

Write one line to the standard output. The output should contain the minimum number of times of watering.

Constraints

- $2 \leq N \leq 200\,000$.



- $1 \leq A_i \leq 1\,000\,000\,000$ ($1 \leq i \leq N$).

Subtasks

1. (40 points) $N \leq 2\,000$.
2. (60 points) No additional constraints.

Sample Input and Output

Sample Input 1	Sample Output 1
5 3 2 2 3 1	3

The condition is satisfied if Bitaro waters the Biba-herbs three times as follows.

- Let $L = 2$ and $R = 5$. Then Bitaro waters the Biba-herbs 2, 3, 4, 5. The heights of the Biba-herbs become 3, 3, 3, 4, 2 from the west.
- Let $L = 2$ and $R = 3$. Then Bitaro waters the Biba-herbs 2, 3. The heights of the Biba-herbs become 3, 4, 4, 4, 2 from the west.
- Let $L = 3$ and $R = 3$. Then Bitaro waters the Biba-herb 3. The heights of the Biba-herbs become 3, 4, 5, 4, 2 from the west.

It is impossible to satisfy the condition if Bitaro waters the Biba-herbs less than three times. Hence the minimum number of times of watering is 3.

Sample Input 2	Sample Output 2
5 9 7 5 3 1	0

Since the condition is already satisfied, the minimum number of times of watering is 0.

Sample Input 3	Sample Output 3
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The condition is satisfied if Bitaro waters the Biba-herb 1 by choosing $L = 1$ and $R = 1$, or he waters the Biba-herb 2 by choosing $L = 2$ and $R = 2$.



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Sample Input 4	Sample Output 4
8 12 2 34 85 4 91 29 85	93