Chief Hopper

HackerRank

Problem Statement

Chief's bot is playing an old DOS-based game. There are $N+1$ buildings in the game - indexed from 0 to N and are placed left-to-right. It is guaranteed that building with index 0 will be of height 0 unit. For buildings with index i ($i \in [1, N]$) height will be h_i units.

At beginning Chief's bot is at building with index 0. At each step, bot jumps to next (right) building. Suppose bot is at k^{th} building and his current energy is $botEnergy$, then in next step he will jump to $(k+1)^{th}$ building. He will gain/lose energy equal in amount to difference between h_{k+1} and $botEnergy$

- If $h_{k+1} > botEnergy$, then he will lose $h_{k+1} - botEnergy$ units of energy.
- Otherwise, he will gain $botEnergy - h_{k+1}$ units of energy.

Goal is to reach N^{th} building, and during the course bot should never have negative energy units. What should be the minimum units of energy with which bot should start to successfully complete the game?

Input Format

The first line contains integer N. Next line contains N space separated integers $h_1, h_2, \cdots, h_N$ representing the heights of the buildings.

Output Format

Print a single number representing minimum units of energy required to complete the game.

Constraints
$1 \leq N \leq 10^5$
$1 \leq h_i \leq 10^5, i \in [1, N]$

Sample Input

```
5
3 4 3 2 4
```

sample Output

```
4
```

Sample Input

```
3
4 4 4
```

Sample Output

```
4
```

Explanation

Sample 1

If initial energy is 4, after step 1 energy is 5, after step 2 it's 6, after step 3 it's 9 and after step 4 it's 16, finally at step 5 it's 28.
You can verify for lower initial energy bot will have -ve energy in the end.

Sample 2
In the second test case if bot has energy 4, it's energy is changed by (4 - 4 = 0) at every step and remains 4.