

F. Fallen Towers

time limit per test: 3 seconds
memory limit per test: 256 megabytes

Pizano built an array a of n towers, each consisting of $a_i \geq 0$ blocks.

Pizano can knock down a tower so that the next a_i towers grow by 1. In other words, he can take the element a_i , increase the next a_i elements by one, and then set a_i to 0. The blocks that fall outside the array of towers disappear. If Pizano knocks down a tower with 0 blocks, nothing happens.

Pizano wants to knock down all n towers in any order, **each exactly once**. That is, for each i from 1 to n , he will knock down the tower at position i exactly once.

Moreover, the resulting array of tower heights **must be non-decreasing**. This means that after he knocks down all n towers, for any $i < j$, the tower at position i must not be taller than the tower at position j .

You are required to output the maximum MEX of the resulting array of tower heights.

The MEX of an array is the smallest non-negative integer that is not present in the array.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

The first line of each test case contains an integer n ($1 \leq n \leq 10^5$) — the number of towers.

The second line of each test case contains n integers — the initial heights of the towers a_1, \dots, a_n ($0 \leq a_i \leq 10^9$).

It is guaranteed that the sum of n over all test cases does not exceed 10^5 .

Output

For each test case, output a single integer — the maximum MEX of the final array.

Example

input	Copy
8	
2	
1 2	
4	
2 1 0 0	
10	
5 9 3 7 1 5 1 5 4 3	
10	
1 1 1 1 1 1 1 1 1 1	
10	
3 2 1 0 3 2 1 0 3 2	
5	
5 2 0 5 5	
1	
1000000000	
7	
4 0 1 0 2 7 7	
output	Copy
2	
3	
7	
4	
5	
4	
1	
3	

Note

Codeforces Round 1022 (Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++23 14.2 (64 bit, ms)

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
321865119	May/29/2025 08:13	Accepted

→ Problem tags

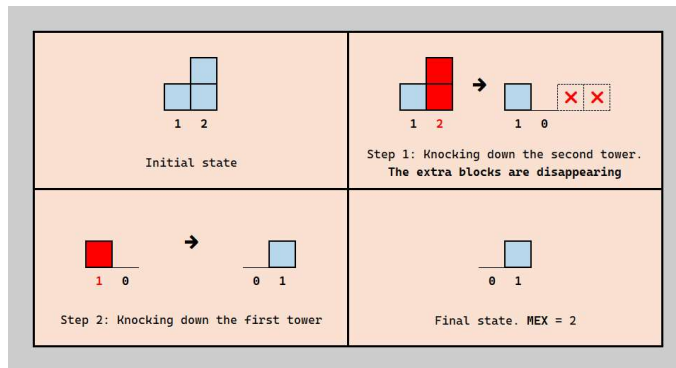
binary search greedy *2900

No tag edit access

→ Contest materials

- Announcement
- Tutorial

Explanation for the first test case.



Explanation for the second test case. Note that all towers were knocked down exactly once, and the final array of heights is non-decreasing.

