

Add One 2

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 1024 megabytes

Little Cyan Fish and his *once-good* friend released a problem called “Add One” in the summer of 2022¹. His friend was very fascinated by the concept of adding one and came up with many ideas for it.

Two years have passed, and the ideas from back then have become vague. Now, Little Cyan Fish wants to play the following game with Little Leaky Fish.

In this game, Little Leaky Fish has a sequence of integers x_1, x_2, \dots, x_n . Initially, all the values of x_i are set to 0. He can then execute the following operations any number of times:

- Choose an integer k ($1 \leq k \leq n$). Then, add one to each x_i for $1 \leq i \leq k$. The cost of such operation is k .
- Choose an integer k ($1 \leq k \leq n$). Then, add one to each x_i for $n - k + 1 \leq i \leq n$. The cost of such operation is k .

Little Cyan Fish also has n integers y_1, y_2, \dots, y_n . He wishes for Little Leaky Fish to perform a series of operations such that the condition $x_i \geq y_i$ holds for all $1 \leq i \leq n$.

This task is too easy for Little Leaky Fish. So he is wondering what is the minimum cost required to meet the goal. Therefore, your task is to write a program to calculate the minimum cost.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \leq T \leq 10^5$), indicating the number of test cases.

For each test case, the first line of the input contains a single integer n ($1 \leq n \leq 10^6$).

The next line of the input contains n integers y_1, y_2, \dots, y_n ($0 \leq y_i \leq 10^9$).

It is guaranteed that the sum of n over all test cases does not exceed 10^6 .

Output

For each test case, output a single line contains a single integer, indicating the answer.

Example

standard input	standard output
3	5
5	5000000000
1 1 1 1 1	76
10	
0 0 0 0 1000000000 0 0 0 0 0	
13	
1 1 4 5 1 4 1 9 1 9 8 1 0	

¹Add One from Petrozavodsk Programming Camp, Summer 2022. <https://qoj.ac/problem/4810>