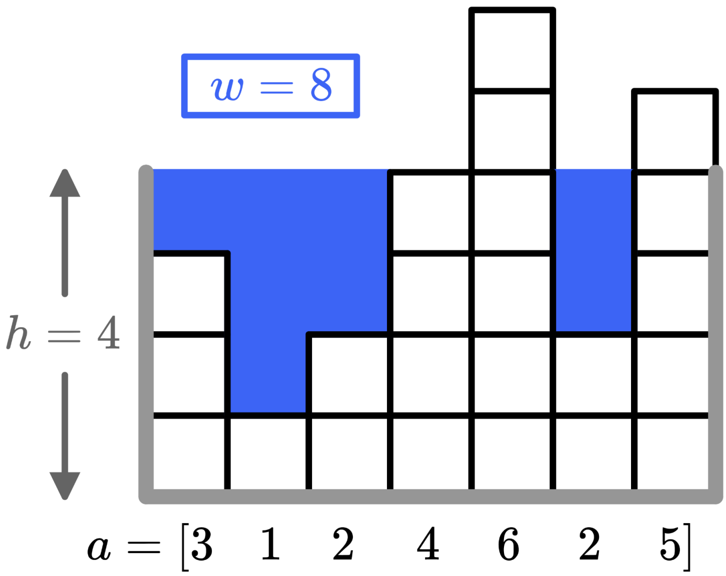
Problem C. Building an Aquarium

Time Limit 2000 ms
Mem Limit 262144 kB

You love fish, that's why you have decided to build an aquarium. You have a piece of coral made of n columns, the i-th of which is a_i units tall. Afterwards, you will build a tank around the coral as follows:

- Pick an integer $h \geq 1$ — the *height* of the tank. Build walls of height h on either side of the tank.
- Then, fill the tank up with water so that the height of each column is h, unless the coral is taller than h; then no water should be added to this column.

For example, with $a = [3, 1, 2, 4, 6, 2, 5]$ and a height of $h = 4$, you will end up using a total of $w = 8$ units of water, as shown.



You can use at most x units of water to fill up the tank, but you want to build the biggest tank possible. What is the largest value of h you can select?

Input

The first line contains a single integer t ($1 \leq t \leq 10^4$) — the number of test cases.

The first line of each test case contains two positive integers n and x ($1 \leq n \leq 2 \cdot 10^5$; $1 \leq x \leq 10^9$) — the number of columns of the coral and the maximum amount of water you can use.

The second line of each test case contains n space-separated integers a_i ($1 \leq a_i \leq 10^9$) — the heights of the coral.

The sum of n over all test cases doesn't exceed $2 \cdot 10^5$.

Output

For each test case, output a single positive integer h ($h \geq 1$) — the maximum height the tank can have, so you need at most x units of water to fill up the tank.

We have a proof that under these constraints, such a value of h always exists.

Examples

Input	Output
5 7 9 3 1 2 4 6 2 5 3 10 1 1 1 4 1 1 4 3 4 6 1984 2 6 5 9 1 8 1 1000000000 1	4 4 2 335 1000000001

Note

The first test case is pictured in the statement. With $h = 4$ we need 8 units of water, but if h is increased to 5 we need 13 units of water, which is more than $x = 9$. So $h = 4$ is optimal.

In the second test case, we can pick $h = 4$ and add 3 units to each column, using a total of 9 units of water. It can be shown that this is optimal.

In the third test case, we can pick $h = 2$ and use all of our water, so it is optimal.