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C. MEX Game 1

time limit per test: 2 seconds memory limit per test: 256 megabytes input: standard input output: standard output

Alice and Bob play yet another game on an array a of size n. Alice starts with an empty array c. Both players take turns playing, with Alice starting first.

On Alice's turn, she picks one element from a, appends that element to c, and then deletes it from a.

On Bob's turn, he picks one element from a, and then deletes it from a.

The game ends when the array a is empty. Game's score is defined to be the MEX[†] of c. Alice wants to maximize the score while Bob wants to minimize it. Find game's final score if both players play optimally.

 † The MEX (minimum excludant) of an array of integers is defined as the smallest non-negative integer which does not occur in the array. For example:

- The MEX of [2, 2, 1] is 0, because 0 does not belong to the array.
- The MEX of [3, 1, 0, 1] is 2, because 0 and 1 belong to the array, but 2 does not.
- The MEX of [0, 3, 1, 2] is 4, because 0, 1, 2 and 3 belong to the array, but 4 does not.

Input

Each test contains multiple test cases. The first line contains a single integer t ($1 \le t \le 2 \cdot 10^4$) — the number of test cases. The description of the test cases follows.

The first line of each test case contains a single integer n ($1 \le n \le 2 \cdot 10^5$).

The second line of each test case contains n integers a_1, a_2, \ldots, a_n ($0 \le a_i < n$).

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, find game's score if both players play optimally.

Example

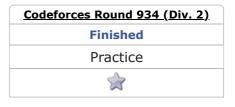


Note

In the first test case, a possible game with a score of $\boldsymbol{2}$ is as follows:

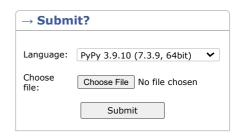
- 1. Alice chooses the element 1. After this move, a=[0,0,1] and c=[1].
- 2. Bob chooses the element 0. After this move, a = [0, 1] and c = [1].
- 3. Alice chooses the element 0. After this move, a=[1] and c=[1,0].
- 4. Bob chooses the element 1. After this move, $a=[\,]$ and c=[1,0].

At the end, c = [1, 0], which has a MEX of 2. Note that this is an example game and does not necessarily represent the optimal strategy for both players.





→ Virtual participation



→ Last submissions		
Submission	Time	Verdict
<u>251781626</u>	Mar/16/2024 19:32	Accepted
<u>251779839</u>	Mar/16/2024 19:28	Wrong answer on pretest 2
251777672	Mar/16/2024 19:24	Runtime error on pretest 2





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