

### 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  $\text{MEX}^\dagger$  of  $c$ . Alice wants to maximize the score while Bob wants to minimize it. Find game's final score if both players play optimally.

$^\dagger$  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  $t$  ( $1 \leq t \leq 2 \cdot 10^4$ ) — the number of test cases. The description of the test cases follows.

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

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

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

input	Copy
3 4 0 0 1 1 4 0 1 2 3 2 1 1	
output	Copy
2 1 0	

#### Note

In the first test case, a possible game with a score of 2 is as follows:

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

Codeforces Round 934 (Div. 2)

Finished

Practice

→ Virtual participation

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: PyPy 3.9.10 (7.3.9, 64bit)

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
<a href="#">251781626</a>	Mar/16/2024 19:32	Accepted
<a href="#">251779839</a>	Mar/16/2024 19:28	Wrong answer on pretest 2
<a href="#">251777672</a>	Mar/16/2024 19:24	Runtime error on pretest 2

→ Problem tags

constructive algorithms games greedy

No tag edit access

→ Contest materials

Announcement (en)

Tutorial (en)

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