

Kick Start 2019 - Round H

H-index

Problem

It is important for researchers to write many high quality academic papers. Jorge has recently discovered a way to measure how impactful a researcher's papers are: the [H-index](#).

The *H-index score* of a researcher is the largest integer h such that the researcher has h papers with at least h citations each.

Jorge has written N papers in his lifetime. The i -th paper has A_i citations. The number of citations that each paper has will never change after it is written. Please help Jorge determine his H-index score after each paper he wrote.

Input

The first line of the input gives the number of test cases, T . T test cases follow. Each test case begins with a line containing N , the number of papers Jorge wrote.

The second line contains N integers. The i -th integer is A_i , the number of citations the i -th paper has.

Output

For each test case, output one line containing `Case #x: y`, where x is the test case number (starting from 1) and y is a space-separated list of integers. The i -th integer is the H-index score after Jorge wrote his i -th paper.

Limits

Time limit: 50 seconds per test set.

Memory limit: 1GB.

$1 \leq T \leq 100$.

$1 \leq A_i \leq 10^5$.

Test set 1 (Visible)

$1 \leq N \leq 1000$.

Test set 2 (Hidden)

$1 \leq N \leq 10^5$.

Sample

Sample Input

```
2
3
```

Sample Output

```
Case #1: 1 1 2
Case #2: 1 1 2 2 2 3
```

5 1 2
6
1 3 3 2 2 15

In Sample Case #1, Jorge wrote **N** = 3 papers.

- After the 1st paper, Jorge's H-index score is 1, since he has 1 paper with at least 1 citation.
- After the 2nd paper, Jorge's H-index score is still 1.
- After the 3rd paper, Jorge's H-index score is 2, since he has 2 papers with at least 2 citations (the 1st and 3rd papers).

In Sample Case #2, Jorge wrote **N** = 6 papers.

- After the 1st paper, Jorge's H-index score is 1, since he has 1 paper with at least 1 citation.
- After the 2nd paper, Jorge's H-index score is still 1.
- After the 3rd paper, Jorge's H-index score is 2, since he has 2 papers with at least 2 citations (the 2nd and 3rd papers).
- After the 4th paper, Jorge's H-index score is still 2.
- After the 5th paper, Jorge's H-index score is still 2.
- After the 6th paper, Jorge's H-index score is 3, since he has 3 papers with at least 3 citations (the 2nd, 3rd and 6th papers).