G. Chess ranking

time limit: 4sec

Every month, the International Chess Federation (FIDE) publishes an official ranking of n professional chess players, the highest player in the ranking is number 1 in the world (currently the best), the next is ranked number 2,...,the lowest player in the ranking is ranked number n. The players are identified by their id, $1 \leq id \leq n$.

1. The initial ranking is as follows, the player with $id = 1$ is ranked number 1, the player with $id = 2$ is ranked number 2,...,the player with $id = n$ is ranked number n.
2. Each month (starting with month 1), the ranking of exactly one chess player is improved by one.

For example if n = 4, the initial ranking is r = [1, 2, 3, 4]. One of the possibilities is.

- First month : r = [1, 3, 2, 4], the ranking of player with $id = 3$ is improved.
- Second month : r = [1, 3, 4, 2], the ranking of player with $id = 4$ is improved.
- Third month : r = [3, 1, 4, 2], the ranking of player with $id = 3$ is improved.
- ...

Note that, the ranking of the player ranked 1 in the k-th month, cannot be improved in the (k + 1)-th month.

Given the ids $i_1, i_2, \ldots, i_m$ $(1 \leq m)$ such that $i_k (1 \leq k \leq m)$ is the id of the player whose ranking has improved in the k-th month. Find the highest and the lowest rankings for each player over a period of m months.

In the above example the highest and the lowest rankings of each player over the first 3 months are :

- Player id = 1 : highest ranking = 1, lowest ranking = 2.
- Player id = 2 : highest ranking = 2, lowest ranking = 4.

- Player id = 3 : highest ranking = 1, lowest ranking = 3.
- Player id = 4 : highest ranking = 3, lowest ranking = 4.

Input

The first line of the input contains one integer t, $0 \leq t \leq 10$ the number of test cases. Then t test cases follow.

The first line of each test case consists of two integers n and m, $1 \leq n \leq 10^5$, $1 \leq m \leq 4.10^5$ the number of chess players in the ranking and number of months.

The second line of each test case contains integers i_1, i_2,…,i_m where i_k is the id of the chess player who improved his ranking in the k-th month.

Output

For each test case, print n pairs of integers. The i-th line should contain the highest and the lowest rankings of each chess player.

Sample cases

2 3 5 3 2 1 3 3 10 6 7 3 5 7 3 6	1 2 2 3 1 3 1 2 2 3 1 3 4 7 4 5 6 7 5 7 8 8 9 9 10 10