Problem H. Mystic Permutation

Time limit 2000 ms
Mem limit 262144 kB

Monocarp is a little boy who lives in Byteland and he loves programming.

Recently, he found a permutation of length n. He has to come up with a *mystic* permutation. It has to be a new permutation such that it differs from the old one in each position.

More formally, if the old permutation is $p_1, p_2, \ldots, p_n$ and the new one is $q_1, q_2, \ldots, q_n$ it must hold that

$$p_1 \neq q_1, p_2 \neq q_2, \ldots, p_n \neq q_n.$$

Monocarp is afraid of lexicographically large permutations. Can you please help him to find the lexicographically minimal *mystic* permutation?

Input

There are several test cases in the input data. The first line contains a single integer t ($1 \leq t \leq 200$) — the number of test cases. This is followed by the test cases description.

The first line of each test case contains a positive integer n ($1 \leq n \leq 1000$) — the length of the permutation.

The second line of each test case contains n distinct positive integers $p_1, p_2, \ldots, p_n$ ($1 \leq p_i \leq n$). It's guaranteed that p is a permutation, i. e. $p_i \neq p_j$ for all $i \neq j$.

It is guaranteed that the sum of n does not exceed 1000 over all test cases.

Output

For each test case, output n positive integers — the lexicographically minimal mystic permutations. If such a permutation does not exist, output -1 instead.

Examples

Input	Output
4 3 1 2 3 5 2 3 4 5 1 4 2 3 1 4 1 1	2 3 1 1 2 3 4 5 1 2 4 3 -1

Note

In the first test case possible permutations that are mystic are $[2, 3, 1]$ and $[3, 1, 2]$. Lexicographically smaller of the two is $[2, 3, 1]$.

In the second test case, $[1, 2, 3, 4, 5]$ is the lexicographically minimal permutation and it is also mystic.

In third test case possible mystic permutations are $[1, 2, 4, 3]$, $[1, 4, 2, 3]$, $[1, 4, 3, 2]$, $[3, 1, 4, 2]$, $[3, 2, 4, 1]$, $[3, 4, 2, 1]$, $[4, 1, 2, 3]$, $[4, 1, 3, 2]$ and $[4, 3, 2, 1]$. The smallest one is $[1, 2, 4, 3]$.