Problem G
Greatest Permutation

A permutation with n elements is a rearrangement of the first n positive integers. For example, if $n = 3$, there are 6 permutations: $(1, 2, 3)$, $(1, 3, 2)$, $(2, 1, 3)$, $(2, 3, 1)$, $(3, 1, 2)$ and $(3, 2, 1)$. A **great permutation** is a permutation with n elements with the form $i, i + 1, i + 2, \ldots, n, 1, 2, \ldots, i - 1$. In other words, a great permutation can be obtained by moving a prefix of $1, 2, \ldots, n$ to its right. Please note that $1, 2, \ldots, n$ is also a great permutation.

For a permutation, let's define its **weight** as the minimum number of times you need to swap two consecutive elements, so that the permutation becomes a great permutation.

For example, the weight of $3, 2, 1, 4$ is 2, because you can make it a great permutation after a minimum of two swaps:

- Swap the 1st and 2nd element: $2, 3, 1, 4$,
- Swap the 3rd and 4th element: $2, 3, 4, 1$.

You are given a sequence representing a permutation with some missing elements. You need to calculate the **minimum weight** among all permutations which can be obtained by replacing missing elements with certain values. For example, given the sequence $2, 3, 0, 0$, where 0s denote missing elements, two possible permutations are $2, 3, 1, 4$ with weight 1 and $2, 3, 4, 1$ with weight 0. So the minimum weight is 0.

Input

The first line of the input contains a single integer t — the number of test cases. t test cases follow, each test case is described as below:

- The first line contains a single integer n $(1 \le n \le 10^6)$ — the number of elements of the given permutation.
- The second line contains n space-separated integers $a_1, a_2, \ldots, a_n$ $(0 \le a_i \le n)$. It is guaranteed that you can get at least one valid permutation after changing all 0s to other values.

The sum of n in all test cases does not exceed 10^6.

Output

For each test case, print the result in a single line.

Sample Input 1	Sample Output 1
2 4 3 2 1 4 4 2 3 0 0	2 0