Problem K. Point Divide and Conquer

Input file: `standard input`
Output file: `standard output`
Time limit: 1 second
Memory limit: 256 megabytes

For a tree T with n vertices (without a root), numbered $1, 2, \ldots, n$, Little A operates on it according to the permutation $p_1, p_2, \ldots, p_n$ to obtain a rooted tree T' as follows:

1. Find the vertex x in the tree T that appears first in the permutation $p_1, p_2, \ldots, p_n$.
2. Remove x from T and add x to T' as the root of T'.
3. The remaining vertices in T form several connected components $T_1, T_2, \ldots, T_k$ (where k may be 0), each of which is still an unrooted tree. For each unrooted tree T_i, operate on it to obtain the rooted tree T'_i.
4. Add each rooted tree T'_i to T' and set the parent of the root of T'_i to be x.

Now given a tree T and the operation permutation $p_1, p_2, \ldots, p_n$, Little A wants to find the parent of each vertex in the rooted tree T' obtained after operating on T according to the permutation $p_1, p_2, \ldots, p_n$.

Input

The first line contains a positive integer T ($1 \le T \le 10^4$), indicating the number of test cases.

For each test case, the first line contains an integer n ($1 \le n \le 10^5$) representing the number of vertices in the tree.

The second line contains n integers $p_1, p_2, \ldots, p_n$ ($1 \le p_i \le n, \forall i \ne j, p_i \ne p_j$), representing the permutation.

The next $n-1$ lines each contain two integers x, y ($1 \le x, y \le n, x \ne y$), representing an edge in the tree.

It is guaranteed that the sum of n across all test cases does not exceed 10^6.

Output

For each test case, output a line with n integers, where the i-th integer represents the parent of vertex i in the rooted tree T' obtained after the operation. If vertex i is the root, then its parent is denoted by 0.

Example

standard input	standard output
3 3 2 3 1 1 2 2 3 5 2 1 4 5 3 1 2 1 3 2 4 2 5 5 1 2 3 4 5 1 2 1 3 2 4 2 5	2 0 2 2 0 1 2 2 0 1 1 2 2

Note

For the first sample case, first $p_1 = 2$, so the root of T' is 2, and T is divided into connected components $T_1 = \{2\}, T_2 = \{3\}$. Thus, both 2 and 3 have 2 as their parent in T'.

For the second sample case, first $p_1 = 2$, so the root of T' is 2, and T is divided into connected components $T_1 = \{1, 3\}, T_2 = \{4\}, T_3 = \{5\}$. Both T_2 and T_3 are trees consisting of single vertices, so both 4 and 5 have 2 as their parent in T'; for $T_1 = \{1, 3\}$, since 1 appears earlier in the sequence p ($p_2 = 1, p_5 = 3$), the root of T'_1 is 1, so the parent of 1 in T' is 2, and the parent of 3 in T' is 1.

For the third sample case, first $p_1 = 1$, so the root of T' is 1, and T is divided into connected components $T_1 = \{2, 4, 5\}, T_2 = \{3\}$. T_2 is a tree consisting of a single vertex, so the parent of 3 in T' is 1; for $T_1 = \{2, 4, 5\}$, since 2 appears earlier in the sequence p ($p_2 = 2, p_4 = 4, p_5 = 5$), the root of T'_1 is 2, so the parent of 2 in T' is 1. Continuing to split, 4 and 5 each form separate subtrees, and their parents in T' are both 2.