Problem B. Break The Speakers

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Milk has a tree with n nodes. Node i has a non-negative integer weight a_i. *Shama* wants to destroy the tree. She may perform one of the following three operations:

- Choose a node whose weight is 0 and whose degree is ≤ 1, then delete the node and its incident edge, if any.
- Choose a node whose weight is nonzero and set $a_i \leftarrow a_i - 1$.
- Choose a node and set its weight to the MEX of the weights of all its neighboring nodes.

Shama wants to delete all nodes as quickly as possible. You need to help her find the minimum number of operations required to achieve this goal.

Recall that the MEX of a set is the smallest non-negative integer that does not occur in the set.

Input

This problem contains multiple test cases.

The first line contains a positive integer T ($1 \leq T \leq 2 \times 10^4$), representing the number of test cases.

For each test case:

- The first line contains an integer n ($1 \leq n \leq 2 \times 10^5$).
- The next $n-1$ lines each contain two integers u_i, v_i ($1 \leq u_i, v_i \leq n$), representing an edge of the tree.
- The last line contains n integers a_i ($0 \leq a_i \leq 10^9$).

It is guaranteed that, in each test case, the given $n-1$ edges form a tree, and that the sum of n over all test cases does not exceed 2×10^5.

Output

For each test case, output one line containing an integer representing the answer.

Example

standard input	standard output
1 5 1 2 1 3 2 4 2 5 1 0 0 4 2	9

Note

One optimal strategy for the sample is as follows:

- Delete node 3.
- Decrease a_1 by 1, then delete node 1.
- Apply the MEX operation once to a_4, then decrease a_4 by 1 and delete node 4.
- Delete node 2.
- Apply the MEX operation once to a_5, then delete node 5.

This uses 9 operations in total.