Problem J. One Piece

Input file:	standard input
Output file:	standard output
Time limit:	3 seconds
Memory limit:	256 megabytes

The Goa Kingdom is a network of n islands (identified by numbers from 1 to n), connected by $n - 1$ bidirectional bridges. The network is structured as a tree. Some islands contain valuable treasures, and Luffy is on a quest to find the treasures from all islands.

In order to ease the treasure hunting, he bought a detector from a local merchant. The detector should have shown the distance from each island to the closest treasure (in number of bridges); however, it seems to be horribly broken, and shows the distance from each island to the **farthest** treasure instead!

Nonetheless, he kept the distances that his broken detector showed for each of the islands, hoping that maybe not everything is lost. He now wonders which islands have a higher chance of containing a treasure.

Your task is to help Luffy by arranging the n islands in order, from highest to lowest probability of containing a treasure, given that he now knows the distances shown by the detector for each of the n islands. Initially, you can assume that each of the islands independently had a 50% chance of containing a treasure; in other words, every subset of islands was equally likely to be the subset of the treasure islands.

Input

The first line of the input contains n ($1 \le n \le 250\,000$), the number of islands. The following $n - 1$ lines describe the bridges. Each bridge connects two distinct islands. Finally, the last line contains n non-negative integers, the distances (in number of bridges) shown on Luffy's detector for each of the islands.

It is guaranteed that there is at least one **non-empty** subset that is consistent with the input data.

Output

Output a permutation of size n, the order of the islands from highest to lowest probability of containing a treasure. If two islands have the same probability of containing a treasure, output them in increasing order of their ids.

Examples

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

Note

In the first example, island 3 must contain a treasure, as it is the only one at distance 2 from island 2. Islands 4 and 5 have probability 2/3 each, while islands 1 and 2 have probability 1/2.

In the second example, the only possible scenario is that island 2 is the only one containing a treasure.