A. Xor-tree

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

Iahub is very proud of his recent discovery, propagating trees. Right now, he invented a new tree, called xor-tree. After this new revolutionary discovery, he invented a game for kids which uses xor-trees.

The game is played on a tree having n nodes, numbered from 1 to n. Each node i has an initial value $init_i$, which is either 0 or 1. The root of the tree is node 1.

One can perform several (possibly, zero) operations on the tree during the game. The only available type of operation is to pick a node x. Right after someone has picked node x, the value of node x flips, the values of sons of x remain the same, the values of sons of sons of x flips, the values of sons of sons of sons of x remain the same and so on.

The goal of the game is to get each node i to have value $goal_i$, which can also be only 0 or 1. You need to reach the goal of the game by using minimum number of operations.

Input

The first line contains an integer n $(1 \le n \le 10^5)$. Each of the next n - 1 lines contains two integers u_i and v_i $(1 \le u_i, v_i \le n; u_i \ne v_i)$ meaning there is an edge between nodes u_i and v_i.

The next line contains n integer numbers, the i-th of them corresponds to $init_i$ ($init_i$ is either 0 or 1). The following line also contains n integer numbers, the i-th number corresponds to $goal_i$ ($goal_i$ is either 0 or 1).

Output

In the first line output an integer number cnt, representing the minimal number of operations you perform. Each of the next cnt lines should contain an integer x_i, representing that you pick a node x_i.

Examples

input

```
10
2 1
3 1
4 2
5 1
6 2
7 5
8 6
9 8
10 5
1 0 1 1 0 1 0 1 0 1
1 0 1 0 0 1 1 1 0 1
```

output

```
2
4
7
```