Query on a tree VII

You are given a tree (an acyclic undirected connected graph) with n nodes. The tree nodes are numbered from 1 to **n**. Each node has a color, white or black, and a weight. We will ask you to perfrom some instructions of the following form:

- **0 u**: ask for the maximum weight among the nodes which are connected to **u**, two nodes are connected if all the node on the path from **u** to **v** (inclusive **u** and **v**) have a same color.
- **1 u**: toggle the color of **u**(that is, from black to white, or from white to black).
- **2 u w**: change the weight of **u** to **w**.

Input

The first line contains a number **n** denoted how many nodes in the tree($1 \le \mathbf{n} \le 10^5$). The next **n**-1 lines, each line has two numbers (**u**, **v**) describe a edge of the tree($1 \le \mathbf{u}, \mathbf{v} \le$ n). The next 2 lines, each line contains **n** number, the first line is the initial color of each node(0 or 1), and the second line is the initial weight, let's say Wi, of each node($|\mathbf{Wi}| \le 10^9$). The next line contains a number **m** denoted how many operations we are going to process($1 \le \mathbf{m} \le 10^5$). The next **m** lines, each line describe a operation (**t**, **u**) as we mentioned above($0 \le \mathbf{t} \le 2$, $1 \le \mathbf{u} \le \mathbf{n}$, $|\mathbf{w}| \le 10^9$).

Output

For each query operation, output the corresponding result.

Example

Input 1:
```
5
1 2
1 3
1 4
1 5
0 1 1 1 1
1 2 3 4 5
3
0 1
1 1
0 1
```

Output 1:
```
1
5
```

Input 2:
```
7
1 2
1 3
2 4
2 5
3 6
3 7
```

0 0 0 0 0 0 0
1 2 3 4 5 6 7
4
0 1
1 1
0 2
0 3

Output 2:
7
5
7

Warning: large input/output data,be careful with certain languages