Problem L
Edge Exchanges

Time Limit: 2.0 seconds

You are given two trees, A and B, each with N vertices. Both trees have the same labeled vertex set $\{1, 2, \ldots, N\}$.

For each i ($1 \leq i \leq N-1$), the i-th edge of A connects vertices u_i and v_i. For each j ($1 \leq j \leq N-1$), the j-th edge of B connects vertices x_j and y_j.

For each $i = 1, 2, \ldots, N-1$, solve the following problem.

> Find an integer j with $1 \leq j \leq N-1$ such that the following exchange leaves both A and B as trees:
>
> - Remove the edge connecting u_i and v_i from A, and remove the edge connecting x_j and y_j from B.
> - Then, add an edge connecting x_j and y_j to A, and add an edge connecting u_i and v_i to B.

Each exchange is considered independently, starting from the original trees A and B.

It can be proved that at least one such integer j exists for every i under the given constraints.

Input

The input consists of a single test case in the following format.

$$
\begin{aligned}
&N \\
&u_1\ v_1 \\
&u_2\ v_2 \\
&\vdots \\
&u_{N-1}\ v_{N-1} \\
&x_1\ y_1 \\
&x_2\ y_2 \\
&\vdots \\
&x_{N-1}\ y_{N-1}
\end{aligned}
$$

The integer N is the number of vertices of both A and B ($2 \leq N \leq 2 \times 10^5$).

The following $N-1$ lines describe the edges of A. For each $i = 1, \ldots, N-1$, the integers u_i and v_i ($1 \leq u_i, v_i \leq N$) mean that the i-th edge connects vertices u_i and v_i. It is guaranteed that A is a tree.

The next $N-1$ lines describe the edges of B. For each $j = 1, \ldots, N-1$, the integers x_j and y_j ($1 \leq x_j, y_j \leq N$) mean that the j-th edge connects vertices x_j and y_j. It is guaranteed that B is a tree.

Output

Output $N-1$ lines. For each $i = 1, 2, \ldots, N-1$, the i-th line should contain an integer j satisfying the condition in the problem statement for the i-th edge of A.

If there are multiple possible answers, you may output any of them.

Sample Input	**Sample Output**
4 1 3 2 4 3 4 1 2 2 3 2 4	1 3 2

In the first line of the sample output, $j = 1$ is chosen for $i = 1$. Exchanging the edge $(1, 3)$ of A with the edge $(1, 2)$ of B leaves both A and B as trees.

For $i = 2$, both the edge of A and the selected edge of B are both $(2, 4)$, so exchanging them does not change either tree. Other valid outputs are also possible.