Diverge and Converge

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

You are given a tree A with N vertices. The vertices of A are numbered $1, 2, \ldots, N$, and the i-th edge $(1 \le i \le N-1)$ connects vertices u_i and v_i of A.

Additionally, you are given another tree B with N vertices. The vertices of B are also numbered $1, 2, \ldots, N$, and the j-th edge $(1 \le j \le N-1)$ connects vertices x_j and y_j of B.

Your task is to find a pair of permutations $((P_1, P_2, \ldots, P_{N-1}), (Q_1, Q_2, \ldots, Q_{N-1}))$ that satisfies the following conditions:

- Perform the following operations 1. and 2. in order for $k = 1, 2, \ldots, N-1$. After completing operations 1. and 2. **for each k**, both A and B must remain as trees.
  1. In tree A, remove the edge connecting vertices u_{P_k} and v_{P_k}, and add an edge connecting vertices x_{Q_k} and y_{Q_k}.
  2. In tree B, remove the edge connecting vertices x_{Q_k} and y_{Q_k}, and add an edge connecting vertices u_{P_k} and v_{P_k}.

It can be proven that under the constraints of this problem, a valid solution always exists.

Input

The input is given in the following format:

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}

- All input values are integers.
- $2 \le N \le 1000$
- $1 \le u_i, v_i, x_j, y_j \le N$
- The given A and B form trees.

Output

Output the answer in the following format:

P_1 P_2 $\cdots$ P_{N-1}
Q_1 Q_2 $\cdots$ Q_{N-1}

Examples

standard input	standard output
4 1 2 2 3 3 4 1 2 2 4 2 3	3 1 2 2 1 3
2 1 2 2 1	1 1
7 1 2 1 3 2 4 2 5 3 6 3 7 1 5 1 6 1 7 5 2 6 3 7 4	1 2 3 4 5 6 1 2 6 4 5 3

Note

In the first example, before the operation, A is a path graph, and B is a star graph.

After the operation for $k = 1$, A becomes a star graph, and B becomes a path graph.

In the operations for $k = 2$, the same edge (in terms of vertex numbers) is removed and added, so the shape of the tree remains unchanged.

After completing the operations for $k = 3$, the original shapes of trees A and B are completely swapped.