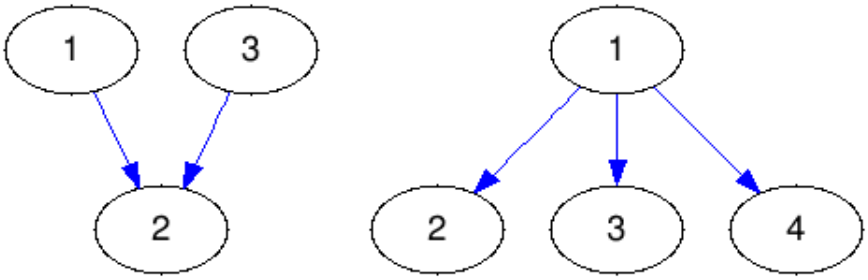
Scientists in a chemical lab in Croatia have been studying the chemical bonds between different molecules. They have a special interest in a group of molecules of the chemical compound nitro hydrogen laminate.
The compound consists of N molecules bound together by $N-1$ covalent bonds and all the molecules are directly or indirectly **tied together** with bonds in a single structure.

The scientists want to modify the compound in a way that all the covalent bonds are transformed into **directed** covalent bonds. Because of the instability of the newly created compound, each molecule will have a large number of impulses coming out of it and travelling to other molecules using the **directed** bonds. An impulse can travel using the directed covalent bond only in the direction of the bond itself.



The instability of the compound is defined as the **largest** possible number of bonds a **single** impulse can use to travel. The scientists want to direct the compound's covalent bonds in a way that the newly created compound is as stable as possible. In other words, their goal is to create a compound with the **minimal longest path** an impulse can take during its travel.

Help the scientists determine the direction of each covalent bond in the compound.

INPUT

The first line of input contains the integer N ($2 \leqslant N \leqslant 100\,000$).
Each of the $N-1$ lines contains the integers a_i and b_i ($1 \leqslant a_i, b_i \leqslant N$) that denote that molecules a_i and b_i are connected with a covalent bond.

OUTPUT

Output $N-1$ lines, where each line must contain 1 if the covalent bond is going to be directed from a_i to b_i, otherwise it contains 0.
If there are multiple possible solutions, output any.

SCORING

In test cases worth at least 30% of total points, it will hold $N \leqslant 20$.

SAMPLE TESTS

ulaz	**ulaz**
3 1 2 2 3	4 2 1 1 3 4 1
izlaz	**izlaz**
1 0	0 1 0

Clarification of the first sample: The example corresponds to the left image from the task. The longest path an impulse can take is 1. Notice that 0 1 is also a correct solution.
Clarification of the second sample: The example corresponds to the right image from the task.