

Company

An international company has N employees, numbered from 1 to N . They are organized in a hierarchical (tree-like) structure, which has the following properties:

- every employee has a direct supervisor, except employee number 1 , who is the manager of the company
- every employee is a direct supervisor of 0 , 1 or **at most 2** other employees

In order to increase the efficiency of their business, the owners of the company decided to split it into three smaller companies. Among other issues which need to be taken care of, a very important problem came up: how to distribute the employees to the three newly formed companies. The following conditions have to be taken into consideration:

- every employee must be distributed to one of the three companies;
- an employee and his/her direct supervisor must not be distributed to the same company;
- if two employees have the same direct supervisor, they must be distributed to different companies.

In order for the three companies to be equally efficient, an extra condition was set. Suppose that N_1 is the number of employees distributed to the first company, N_2 is the number of employees distributed to the second company and N_3 is the number of employees distributed to the third company ($N_1 + N_2 + N_3 = N$). Then, the difference $\max(N_1, N_2, N_3) - \min(N_1, N_2, N_3)$ must be as small as possible. Here, $\max(a, b, c)$ represents the maximum value among a, b and c , and $\min(a, b, c)$ represents the minimum value among a, b and c .

Input data

(file: **comp.in**)

The first line of the input file contains the integer number N . Each of the following $N-1$ lines contains two integers a and b ($1 \leq a, b \leq N$), meaning that the employee number b is the direct supervisor of the employee number a .

Output data

(file: **comp.out**)

The output file will contain N integers, from the set $\{1, 2, 3\}$, separated by blanks. The first number represents the company to which the first employee will be distributed, the second number represents the company to which the second employee will be distributed and so on..

Constraints

- $1 \leq N \leq 16000$
- The solution is not unique, any distribution of the employees which minimizes the specified difference is acceptable.
- The input data is correct.

Example

comp.in	comp.out
6	3 1 3 2 1 2
2 1	
3 2	
4 2	
5 3	
6 3	

Time Limit: 0.1 seconds/test