Task: KLU
Club Members

Byteotian Discussion Club is most extraordinary in its every aspect. Each of its 2^n members has filled out a questionnaire containing n fundamental Yes or No questions. Each member's answers can of course be encoded as a sequence of n bits, which yields an integer in the range from 0 to $2^n - 1$. We are going to ignore the specifics of questions formulations or the mapping of Yes and No answers to 0 and 1. Instead, we list some extraordinary facts about the club members below.

No two club members have given the same answers, i.e., each number in the aforementioned range is present. Moreover, exactly 2^{n-1} of the club members are men and the remaining 2^{n-1} members are women. If this were not extraordinary enough, they form in fact 2^{n-1} couples. During club sessions, the members sit at a *round* table. We would like to sit them so that every member sits between to their partner and a *nearly agreeing* member, i.e., one who answered only a single question differently.

Input

In the first line of the standard input, there is an integer n ($2 \leq n \leq 19$) specifying the number of fundamental questions. The following 2^{n-1} lines describe the member couples: the i-th such line contains two integers a_i, b_i ($0 \leq a_i, b_i \leq 2^n - 1$), separated by a single space, which indicate that the club members whose questionnaire answers are encoded by a_i and b_i are a couple. Each of the 2^n numbers representing answers is going to appear on input exactly once.

Output

A single line should be printed to the standard output, containing the word `NIE` (Polish for *no*) if no placement of club members satisfies aforementioned requirements, and a valid placement otherwise; the latter should be a sequence of 2^n integers (encoding the answers of successive members along the table), separated by single spaces.

If there is more than one correct answer, print any of those.

Example

For the input data: the correct result is:

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

```
0 5 7 2 6 3 1 4
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