Problem J. Tree Automorphisms

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	256 mebibytes

Let T be a tree on n vertices. We call permutation $\pi = \pi_1, \pi_2, \dots, \pi_n$ an automorphism of T if, for any pair of vertices (u, v), there is an edge between them if and only if there is an edge between π_u and π_v.

Let $\alpha = \alpha_1, \alpha_2, \dots, \alpha_n$ and $\beta = \beta_1, \beta_2, \dots, \beta_n$ be two permutations. Then their composition $\gamma = \alpha \circ \beta$ is defined as $\gamma = \alpha_{\beta_1}, \alpha_{\beta_2}, \dots, \alpha_{\beta_n}$, that is, $\gamma_i = \alpha_{\beta_i}$. Automorphisms of T are closed under composition, so if α and β are two automorphisms of T, then $\alpha \circ \beta$ is its automorphism as well. Indeed, it may be conceived as if we firstly applied automorphism β and then automorphism α.

You have to find a set of automorphisms $P = \{\pi^{(1)}, \pi^{(2)}, \dots, \pi^{(k)}\}$ such that $k < n$ and any automorphism of T may be represented as finite composition of permutations from P.

Input

The first line of input contains a single integer n ($2 \le n \le 50$), which is the number of vertices in the tree.

Each of the following $n - 1$ lines contains two integers u_i and v_i ($1 \le u_i, v_i \le n$) meaning that there is an edge between vertices u_i and v_i in the tree.

Output

On the first line, output a single integer k ($1 \le k < n$), which is the number of permutations in the set P.

Each of the following k lines should contain n integers each, denoting i-th permutation $\pi_1^{(i)}, \pi_2^{(i)}, \dots, \pi_n^{(i)}$.

If there are several possible sets P, output any one of them. It is guaranteed that the answer always exists.

Examples

<table>
<tr><th>standard input</th><th>standard output</th></tr>
<tr><td>2
1 2</td><td>1
2 1</td></tr>
<tr><td>3
1 2
1 3</td><td>1
1 3 2</td></tr>
<tr><td>4
1 2
1 3
1 4</td><td>2
1 3 2 4
1 4 3 2</td></tr>
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