Problem F. Haitang and Diameters

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	512 megabytes

Haitang defines the **distance** between a pair of points on a tree as the sum of the weights of all the edges on the simple path.

Haitang defines the number of diameters of a tree as the number among $\binom{n}{2}$ ways to choose a pair of points with the maximum **distance**.

Given a tree with n vertices, you can assign a weight of 0 or 1 to each edge.

You need to find the sum of the number of diameters of all the trees generated by all 2^{n-1} assignment methods, modulo 998244353.

Input

The first line contains a single integer n ($2 \le n \le 2000$) — the number of vertices in the tree.

Each of the next $n-1$ lines contains two integers u_i and v_i ($1 \le u_i, v_i \le n$), representing an edge between u_i and v_i.

It is guaranteed that the given edges form a tree.

Output

The only line contains an integer — the answer modulo 998244353.

Examples

standard input	standard output
3 1 2 2 3	8
5 1 2 1 3 2 4 2 5	50