

Problem C. UUUUUnion

Time limit 3000 ms

Memory limit 256MB

Problem Description

As an intern in TILLI company, MinJ has to combine n magnets into a super large magnet. Initially, the n magnets are placed separately on the desk. Then, at the i -th round, MinJ will choose two piles of magnets, denoted as X_i and Y_i , respectively, to merge into one pile of magnets.

However, this simple action doesn't amuse the young girl. Therefore, she decides to add some fun. First, she assigns an Entertaining Value (EV) to each magnet. The EV of the i -th magnet is i . For each round, MinJ will add magnets with an EV of 1 to the smaller pile until both piles have the same size. After that, MinJ allows magnets from different piles to attract each other one-to-one, and she will gain happiness proportional to their product.

Formally, the process at the i -th round that MinJ does is as follows:

1. For magnetic piles $A = [a_1, a_2, \dots, a_r]$ and $B = [b_1, b_2, \dots, b_k]$, append some 1-EV magnets to the smaller one until they have equal size. If $r = k$ at the beginning, MinJ skips this step.
2. Without loss of generality, let $r = k$. Then MinJ can shuffle A and B to $A' = [a'_1, a'_2, \dots, a'_r]$ and $B' = [b'_1, b'_2, \dots, b'_k]$.
3. MinJ gains $S_i = \left(\sum_{j=1}^r a'_j b'_j\right)$ happiness.
4. MinJ kicks out the magnets which are appended at the 1. step.

MinJ wants the happiness as large as possible. She asks for your help. You will get which piles will be merged each round. Help her calculate the total happiness she gains after $n - 1$ rounds. Baby, don't say no.

Wait a minute? Oh, the final answer seems to be very large. Output it with modulo 998244353. Baby, don't say no.

Input format

The first line has an integer n , the number of magnets.

The next $n - 1$ lines contain 2 integers X_i and Y_i , meaning that the i -th round has to combine the piles which X_i and Y_i belong to, respectively.

Restriction

- $1 \leq n \leq 3 \times 10^5$
- $1 \leq X_i, Y_i \leq n$

Output format

Output an integer, which represents the total happiness modulo 998244353.

Subtask score

Subtask	Score	Additional Constraints
1	100	No constraints

Sample

Sample Input 1

```
12
1 3
8 11
10 7
6 5
1 7
8 5
4 2
12 8
7 9
12 7
1 2
```

Sample Output 1

```
1011
```

Sample Input 2

```
5
1 5
2 4
3 1
2 5
```

Sample Output 2

```
56
```

Notes