

D. Number Of Permutations

time limit per test: 2 seconds
 memory limit per test: 256 megabytes
 input: standard input
 output: standard output

You are given a sequence of n pairs of integers: $(a_1, b_1), (a_2, b_2), \dots, (a_n, b_n)$. This sequence is called bad if it is sorted in non-descending order by first elements or if it is sorted in non-descending order by second elements. Otherwise the sequence is good. There are examples of good and bad sequences:

- $s = [(1, 2), (3, 2), (3, 1)]$ is bad because the sequence of first elements is sorted: $[1, 3, 3]$;
- $s = [(1, 2), (3, 2), (1, 2)]$ is bad because the sequence of second elements is sorted: $[2, 2, 2]$;
- $s = [(1, 1), (2, 2), (3, 3)]$ is bad because both sequences (the sequence of first elements and the sequence of second elements) are sorted;
- $s = [(1, 3), (3, 3), (2, 2)]$ is good because neither the sequence of first elements $[1, 3, 2]$ nor the sequence of second elements $[3, 3, 2]$ is sorted.

Calculate the number of permutations of size n such that after applying this permutation to the sequence s it turns into a good sequence.

A permutation p of size n is a sequence p_1, p_2, \dots, p_n consisting of n distinct integers from 1 to n ($1 \leq p_i \leq n$). If you apply permutation p_1, p_2, \dots, p_n to the sequence s_1, s_2, \dots, s_n you get the sequence $s_{p_1}, s_{p_2}, \dots, s_{p_n}$. For example, if $s = [(1, 2), (1, 3), (2, 3)]$ and $p = [2, 3, 1]$ then s turns into $[(1, 3), (2, 3), (1, 2)]$.

Input

The first line contains one integer n ($1 \leq n \leq 3 \cdot 10^5$).

The next n lines contains description of sequence s . The i -th line contains two integers a_i and b_i ($1 \leq a_i, b_i \leq n$) — the first and second elements of i -th pair in the sequence.

The sequence s may contain equal elements.

Output

Print the number of permutations of size n such that after applying this permutation to the sequence s it turns into a good sequence. Print the answer modulo 998244353 (a prime number).

Examples

input	Copy
3	
1 1	
2 2	
3 1	
output	Copy
3	

input	Copy
4	
2 3	
2 2	
2 1	
2 4	
output	Copy
0	

input	Copy
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Educational Codeforces Round 71 (Rated for Div. 2)

Finished

Practice



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Language: GNU G++11 5.1.0

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- [Announcement #2 \(ru\)](#) 
- [Tutorial #1 \(en\)](#) 
- [Tutorial #2 \(en\)](#) 
- [Tutorial #3 \(ru\)](#) 

3
1 1
1 1
2 3
output
4

Copy

Note

In first test case there are six permutations of size 3:

1. if $p = [1, 2, 3]$, then $s = [(1, 1), (2, 2), (3, 1)]$ — bad sequence (sorted by first elements);
2. if $p = [1, 3, 2]$, then $s = [(1, 1), (3, 1), (2, 2)]$ — bad sequence (sorted by second elements);
3. if $p = [2, 1, 3]$, then $s = [(2, 2), (1, 1), (3, 1)]$ — good sequence;
4. if $p = [2, 3, 1]$, then $s = [(2, 2), (3, 1), (1, 1)]$ — good sequence;
5. if $p = [3, 1, 2]$, then $s = [(3, 1), (1, 1), (2, 2)]$ — bad sequence (sorted by second elements);
6. if $p = [3, 2, 1]$, then $s = [(3, 1), (2, 2), (1, 1)]$ — good sequence.

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