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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: $(a_1,b_1),(a_2,b_2),\ldots,(a_n,b_n)$. 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:
- 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, \ldots, 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, \ldots, 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 ($1 \le n \le 3 \cdot 10^5$).

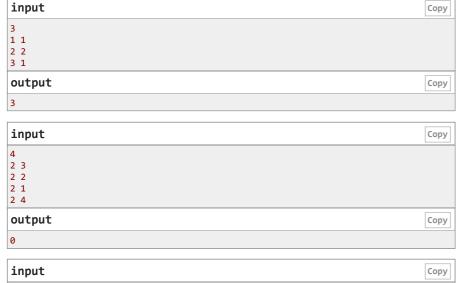
The next n lines contains description of sequence s. The i-th line contains two integers a_i and b_i ($1 \le a_i, b_i \le n$) — the first and second elements of *i*-th pair in the sequence.

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



Educational Codeforces Round 71 (Rated for Div. 2)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?		
Language:	GNU G++11 5.1.0 ▼	
Choose file:	选择文件 未选择任何文件	
	Submit	

→ Problem tags		
combinatorics *1800		
	No tag edit access	

→ Contest materials

- Announcement #1 (en) Announcement #2 (ru) Tutorial #1 (en) × Tutorial #2 (en) ×
 - Tutorial #3 (ru)

```
3
1 1
1 1
2 3

output

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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