

Growing Prefix Span

Input file: **standard input**
Output file: **standard output**
Time limit: 4 seconds
Memory limit: 512 megabytes

For a permutation of $1, 2, \dots, n$, let s_i be the length of the **shortest contiguous subarray** containing all values $1, 2, \dots, i$.

Let $\text{pos}_p(x)$ be the position of x in the permutation; we have

$$s_i = \max_{1 \leq x \leq i} \text{pos}_p(x) - \min_{1 \leq x \leq i} \text{pos}_p(x) + 1.$$

For each i , an interval constraint $[l_i, r_i]$ is given.

Please count the permutations satisfying $l_i \leq s_i \leq r_i$ for every i . Print the answer modulo 998244353.

Input

The first line contains an integer n ($1 \leq n \leq 2 \cdot 10^5$).

Each of the next n lines contains two integers l_i and r_i ($1 \leq l_i \leq r_i \leq n$).

Output

Print the number of valid permutations modulo 998244353.

Please note that a valid permutation may not exist.

Example

standard input	standard output
3 1 1 2 2 3 3	4

Note

The valid permutations in the example are $(1, 2, 3)$, $(2, 1, 3)$, $(3, 1, 2)$, and $(3, 2, 1)$.