

## Problem L

### Expected Beauty

Morgan the robot has an array  $A$  of size  $N$ , indexed from 1 to  $N$ . The value of each element in  $A$  is randomly generated;  $A_i$  can be any integer from  $L_i$  to  $R_i$  (inclusive) with equal probability.

Morgan defines the *beauty* of  $A$  as follows. First, Morgan has a variable named `score` that is initialized to 0. An operation on the array  $a$  is as follows:

- Choose an index  $i$  such that  $1 \leq i < |a|$  and  $a_i = a_{i+1}$ . If no such  $i$  exists, then the operation cannot be performed.
- Add the value of  $a_i$  to `score` and remove  $a_i$  from the array.
- The array  $a$  becomes the concatenation of the remaining elements without changing its order.

The *beauty* of  $A$  is the maximum value of `score`<sup>2</sup> Morgan can possibly get after performing zero or more operations on the array  $A$ .

Since the array is randomly generated, Morgan wonders about the expected beauty of  $A$ . Due to the inefficiency of his algorithm, Morgan asks for your help to calculate the expected value.

#### Input

Input begins with an integer  $N$  ( $1 \leq N \leq 200\,000$ ) representing the size of array  $A$ . Each of the next  $N$  lines contains two integers  $L_i$   $R_i$  ( $1 \leq L_i \leq R_i \leq 10^8$ ).

#### Output

Let  $M = 998\,244\,353$ . It can be shown that the expected value can be expressed as an irreducible fraction  $\frac{p}{q}$ , where  $p$  and  $q$  are integers and  $q \not\equiv 0 \pmod{M}$ . Output an integer  $x$  in a single line such that  $0 \leq x < M$  and  $x \cdot q \equiv p \pmod{M}$ .

#### Sample Input #1

```
3
1 2
2 3
1 3
```

#### Sample Output #1

```
831870298
```

*Explanation for the sample input/output #1*

There are 12 possibilities of  $A$ . Out of all possibilities, the following has positive beauty.

- $[1, 2, 2]$  with a beauty of 4.
- $[1, 3, 3]$  with a beauty of 9.
- $[2, 2, 1]$  with a beauty of 4.
- $[2, 2, 2]$  with a beauty of 16.
- $[2, 2, 3]$  with a beauty of 4.
- $[2, 3, 3]$  with a beauty of 9.

Therefore, the expected beauty of  $A$  is  $(4 + 9 + 4 + 16 + 4 + 9)/12 = \frac{46}{12} = \frac{23}{6}$ . Since  $831\,870\,298 \cdot 6 \equiv 23 \pmod{998\,244\,353}$ , you need to output 831 870 298.

**Sample Input #2**

```
4
1 1
1 1
2 2
2 2
```

**Sample Output #2**

```
9
```

*Explanation for the sample input/output #2*

The only possible value of  $A$  is  $[1, 1, 2, 2]$  with a beauty of  $(1 + 2)^2 = 9$ .

**Sample Input #3**

```
3
1 2
3 4
5 6
```

**Sample Output #3**

```
0
```