IOITC 2020 TST 3

The Social Gathering

There are n people numbered 1 to n invited to a social gathering.

There are n seats, also numbered 1 to n. Each person i has a social index (l_i, r_i) meaning, wherever he is seated, he befriends l_i people to his immediate left and r_i people to his immediate right. If there are fewer than l_i people to his left, he befriends all of them and similarly if there are fewer than r_i people to his right, he befriends all of them.

Two people i, j seated at seats s_i, s_j $(s_i < s_j)$ become friends if either $r_i \geq s_j - s_i$ or $l_j \geq s_j - s_i$, that is, at least one of i or j can befriend the other.

There are also m pairs of people who are enemies and would never become friends irrespective of where they are seated.

The social index of the gathering for a given seating arrangement of the people is defined as the number of pairs of people who become friends. Find the sum of the social index of the gathering over all possible seating arrangements of the people modulo $10^9 + 7$.

Note: Two seating arrangements are considered to be different if there is at least one person who is not seated in the same seat in both the arrangements.

Input

- The first line contains two integers n, m - the number of people invited and number of pairs of people who can never be friends.
- The i-th line of the next n lines contains two integers l_i, r_i - the social index of the i-th person.
- The i-th line of the next m lines contains two integers p_{i1}, p_{i2} - the pairs of enemies.

Output

Print a single line - the sum of the social index of the gathering over all possible seating arrangements of the people modulo $10^9 + 7$.

Test Data

In all inputs,

- $1 \leq n \leq 3 \cdot 10^5$
- $0 \leq m \leq \min\left(5 \cdot 10^5, \frac{n(n-1)}{2}\right)$
- $0 \leq l_i, r_i \leq n - 1$
- $1 \leq p_{i_1},\ p_{i_2} \leq n$
- $p_{i_1} \neq p_{i_2}$

Subtask 1 (11 Points): $n \leq 1000$

Subtask 2 (18 Points): $l_i, r_i \leq \min(10, n - 1)$

Subtask 3 (34 Points): $l_i = r_i$

Subtask 4 (37 Points): No additional constraints

Sample Input 1

```
8 1
6 3
7 0
3 3
7 0
0 3
1 7
0 5
1 7
6 8
```

Sample Output 1

```
827280
```

Sample Input 2

```
3 1
0 1
1 1
1 2
1 2
```

Sample Output 2

```
10
```

Explanation 2

Let us consider one seating arrangement, where Seat 1 has Person 2 sitting in it, Seat 2 has 1 and Seat 3 has 3. We denote this by $(2, 1, 3)$. 1 and 3 will become friends, because 3 can befriend 1 person to his left. 1 can also befriend 1 person to his right, but that is not needed as 3 has already befriended him. 2 and 3 will not become friends, as 2 can only befriend 1 person to his right, and 3 can only befriend 1 person to his left. 1 and 2 could have become friends, because 2 can befriend 1 person to his right, but because they are already enemies, they will not become friends. So, there is only 1 pair of friends in this arrangement, and so the social index of this is 1.

Similarly, the social index of the 5 other possible arrangements is given below:

- $(1, 2, 3)$ has a social index of 1.
- $(1, 3, 2)$ has a social index of 2.
- $(2, 3, 1)$ has a social index of 2.
- $(3, 1, 2)$ has a social index of 2.
- $(3, 2, 1)$ has a social index of 2.

So the sum is $1 + 1 + 2 + 2 + 2 + 2 = 10$.

Limits

Time: 2 seconds

Memory: 256 MB