Estate Construction
Problem ID: estateconstruction

Thuc has been playing Age of Empire 2 for several months. In this game, Thuc plays the king's role, dictating his villagers to build estates for the kingdom. The play area can be represented by a board of size $10^9 \times 10^9$, in which the intersection of i-th row and j-th column is denoted by (i, j).

In this game, the resource value of the each cell (i, j) is $(i \times j)^k$, where k is a positive parameter given to the players at the start of the game.

Thuc has already planned to build n estates on the play area to capture those resources. The i-th estate can be represented by a rectangle with coordinates $x_{i,1}, y_{i,1}, x_{i,2}, y_{i,2}$ $(1 \leq x_{i,1} \leq x_{i,2} \leq 10^9, 1 \leq y_{i,1} \leq y_{i,2} \leq 10^9)$, meaning he will capture all cells (x, y) satisfying $x_{i,1} \leq x \leq x_{i,2}$ and $y_{i,1} \leq y \leq y_{i,2}$. There is no restriction of constructing in this game, thus, estates might share some common cells with others.

Unfortunately, Thuc found out today, that he could not capture a cell's resource more than once. Hence, his calculation for the total resource value was no longer correct. Your task is to help Thuc recalculate the actual total resource value he can capture with his plan.

Input

The first line contains two integers n and k $(1 \leq n \leq 2 \cdot 10^5, 1 \leq k \leq 20)$ — the number of estates in Thuc's plan and the parameter k.

On the next n lines, the i-th line contains four integers $x_{i,1}, y_{i,1}, x_{i,2}, y_{i,2}$ representing the rectangle coordinates of the i-th estate in Thuc's plan.

Output

Print an integer denoting the actual total resource value Thuc can capture with his plan in modulo $10^9 + 7$.

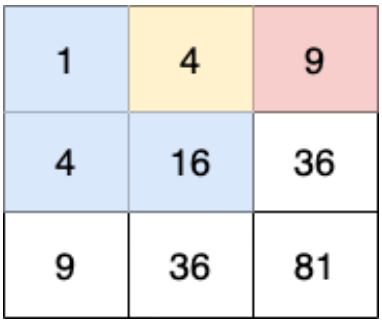

Figure 1: Occupied cells are highlighted. Two estates in the sample share the cell $(1, 2)$.

Sample Input 1	Sample Output 1
2 2 1 1 2 2 1 2 1 3	34