

Problem G. Matching In Multiplication

Input file: *standard input*
Output file: *standard output*
Time limit: 1 second
Memory limit: 512 mebibytes

In the mathematical discipline of graph theory, a *bipartite graph* is an undirected graph whose vertices can be divided into two disjoint sets U and V such that every edge connects some vertex in U to some vertex in V . The vertex sets U and V are both independent sets, and are usually called the parts of the graph. Equivalently, a bipartite graph is a graph that does not contain any odd-length cycles. A *matching* in a graph is a set of edges without common vertices. A *perfect matching* is a matching such that each vertex is covered by an edge from the matching.

Little Q misunderstood the definition of bipartite graph. He thinks the size of U is equal to the size of V , and for each vertex p in U , there are exactly two edges from p . Based on such weighted graph, he defines the weight of a perfect matching as the product of weights of all the edges included in the matching, and the weight of a graph as the sum of all the perfect matchings' weights.

Your task is to write a program to compute the weight of a weighted graph made by Little Q.

Input

The first line of the input contains an integer n denoting the size of U ($1 \leq n \leq 3 \cdot 10^5$). The vertices in U and V are labeled separately by the integers $1, 2, \dots, n$.

In the next n lines, the i -th line contains four integers $v_{i,1}$, $w_{i,1}$, $v_{i,2}$ and $w_{i,2}$ which mean that there is an edge between U_i and $V_{v_{i,1}}$ with weight $w_{i,1}$, and there is another edge between U_i and $V_{v_{i,2}}$ with weight $w_{i,2}$ ($1 \leq v_{i,j} \leq n$, $1 \leq w_{i,j} \leq 10^9$).

It is guaranteed that the given graph has at least one perfect matching, and there is at most one edge between every pair of vertices.

Output

Print a single line containing a single integer: the weight of the given graph. Since the answer may be very large, print it modulo 998 244 353.

Example

| standard input | standard output |
|-------------------------|-----------------|
| 2 2 1 1 4 1 4 2 3 | 16 |