Problem H. Points Selection

Input file:	standard input
Output file:	standard output
Time limit:	3 seconds
Memory limit:	512 megabytes

There are n points $p_1, p_2, \ldots, p_n$ on the 2D plane. The i-th point p_i is located at (x_i, y_i) with weight w_i.

Consider a query with parameters (a, b, c), let $S(a, b) = \{p_i | x_i \le a \wedge y_i \le b\}$. The query denotes "*Is it possible to select a subset T from S such that* $(\sum_{p_i \in T} w_i) \bmod n = c$*?*" $(T \subseteq S)$

Let query(a, b, c) = True/False be the answer to the query with parameters (a, b, c). You are required to answer all possible queries. Instead of printing $O(n^3)$ lines, you only need to compute the following value:

$$ans = (\sum_{a=1}^{n} \sum_{b=1}^{n} \sum_{c=1}^{n-1} a \cdot b \cdot c \cdot [\text{query}(a, b, c) = \text{True}]) \bmod 2^{64}$$

Input

The first line of the input contains a single integer n $(2 \le n \le 5 \times 10^5)$, denoting the number of points.

In the next n lines, the i-th line contains three integers x_i, y_i and w_i $(1 \le x_i, y_i, w_i \le n)$, describing the i-th point. Note that two points may share the same location.

It is guaranteed that all the values of x_i, y_i and w_i are chosen uniformly at random from integers in their corresponding ranges. The randomness condition does not apply to the sample test case, but your solution must pass the sample as well.

Output

Print a single line containing a single integer, denoting the value of ans.

Examples

standard input	standard output
3 1 2 2 2 3 1 3 1 3	75
5 1 1 4 5 1 4 2 3 3 1 4 1 2 5 2	1935