Problem C. Least Common Multiple

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

You are given an integer multiset $S = \{x_1, x_2, \ldots, x_n\}$, where $x_i = 2^{a_i} \cdot 3^{b_i}$.

Consider all $2^n - 1$ non-empty subsets of S. For each subset, find it's LCM (least common multiple) and output the sum of these values. As long as the answer can be very large, find the sum of LCM modulo $10^9 + 7$.

Input

The first line of the input contains an integer n ($1 \le n \le 10^5$). Each of the following n lines contains two integers a_i, b_i ($0 \le a_i, b_i \le 10^9$).

Output

Print one integer — answer to the problem.

Examples

standard input	standard output
2 0 1 1 0	11
3 1 2 2 1 1 2	174