Problem C Lease common multiple

bobo has an integer set $S = \{x_1, x_2, \ldots, x_n\}$, where $x_i = 2^{a_i} \cdot 3^{b_i}$.

For each non-empty subsets of S, bobo added the LCM (least common multiple) of the subset up. Find the sum of LCM modulo $(10^9 + 7)$.

Input

The first line contains n ($1 \leq n \leq 10^5$). Each of the following n lines contain 2 integers a_i, b_i ($0 \leq a_i, b_i \leq 10^9$).

Output

A single integer, the value of the sum.

Sample input 1

```
2
0 1
1 0
```

Sample output 1

```
11
```

Sample input 2

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

Sample output 2

```
174
```