

Problem J. Rational Dimasik

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

Little Dimasik is a rational numbers fan. He has n rational numbers $\frac{x_i}{y_i}$. Recently Dimasik learned how to subtract rational numbers.

Recall that every rational number may be expressed in a unique way as an irreducible fraction $\frac{a}{b}$, where a and b are coprime integers and $b > 0$.

Let us define the function $d\left(\frac{x_i}{y_i}\right)$ as the denominator of the rational number $\frac{x_i}{y_i}$ in irreducible notation. For example, $d\left(\frac{14}{6}\right) = d\left(\frac{7}{3}\right) = 3$.

Now Dimasik wants to calculate the value

$$\prod_{1 \leq i < j \leq n} d\left(\left|\frac{x_i}{y_i} - \frac{x_j}{y_j}\right|\right).$$

But soon he realized that this problem is too hard for him. Dimasik asks you to help him. As the value may be very large, find it modulo 998 244 353.

Input

The first line contains one integer n ($1 \leq n \leq 2 \cdot 10^5$) denoting the number of rational numbers Dimasik has.

Each of the following n lines contains two integers x_i and y_i ($0 \leq x_i \leq 10^9$, $1 \leq y_i \leq 10^6$) representing the numerator and denominator of the i -th rational number.

Output

Print a single integer — the answer to the problem modulo 998 244 353.

Examples

standard input	standard output
2 1 3 3 7	21
3 3 2 7 15 5 12	7200