Barter System

Time limit: *1000 ms*
Memory limit: *256 MB*

In a world where currency is not available, people fulfill their necessities by exchanging commodities among them. However, not all commodities are equal.

Exchange rate of commodities A to B is defined as the number of units of B one can get with one unit of A.

Given exchange rates of a set of pairs of commodities as input, answer a set of queries by finding the exchange rate of a specific pair.

Standard input

The first line of the input is an integer N which indicates the number of given exchange rates to follow. The next N lines consists of A, B, r triplets where A and B are the commodities and r is the exchange rate such that $A = r \cdot B \pmod{998244353}$.

The next line contains another integer Q which represents the number of queries. The following Q lines consists of a pair of commodities K and L.

Standard output

For each of the Q queries you need to find r such that $K = r \cdot L$.

It can be shown that r can be represented as $\frac{X}{Y}$, where X and Y are coprime integers and $X \neq 0 \pmod{998244353}$. For each query print $X \cdot Y^{-1} \pmod{998244353}$.

If the exchange rate can not be computed using the given information, print `-1`.

Constraints and notes

- $1 \leq N, Q \leq 2 \cdot 10^4$
- $1 \leq |A|, |B| \leq 50$
- $1 \leq r < 998244353$
- All exchange rates are consistent

Input	Output	Explanation
3 Rice Bean 399297742 Bean Beef 598946612 Banana Apple 698771048 3 Rice Beef Beef Banana Rice Rice	279508419 -1 1	Rice = $399297742 \cdot 598946612$ Beef, which is 279508419. There is not enough information to convert from Beef to Banana, so `-1` is printed.