Arbitrage – Who wants to work for World Bank?

Source:

University of Ulm Local Contest 1996

Arbitrage is the use of discrepancies in currency exchange rates to transform one unit of a currency into more than one unit of the same currency. For example, suppose that 1 US Dollar buys 0.5 British pounds, 1 British pound buys 10.0 French francs, and 1 French franc buys 0.21 US dollars. Then, by converting currencies, a clever trader can start with 1 US dollar and buy 0.5 * 10.0 * 0.21 = 1.05 US dollars, making a profit of 5 percent.

Your job is to write a program that takes a list of currency exchange rates as input and then determines whether arbitrage is possible or not.

Input: Arbitrage.inp

The input file will contain one or more test cases. On the first line of each test case there is an integer n ($1 \leq n \leq 30$), representing the number of different currencies. The next n lines each contain the name of one currency. Within a name no spaces will appear. The next line contains one integer m, representing the length of the table to follow. The last m lines each contain the name c_i of a source currency, a real number r_{ij} which represents the exchange rate from c_i to c_j and a name c_j of the destination currency. Exchanges which do not appear in the table are impossible.

Test cases are separated from each other by a blank line. Input is terminated by a value of zero (0) for n.

Output: Arbitrage.out

For each test case, print one line telling whether arbitrage is possible or not in the format "Case *case*: Yes", respectively "Case *case*: No".

Example

Input:

```
3
USDollar
BritishPound
FrenchFranc
```

```
3
USDollar 0.5 BritishPound
BritishPound 10.0 FrenchFranc
FrenchFranc 0.21 USDollar

3
USDollar
BritishPound
FrenchFranc
6
USDollar 0.5 BritishPound
USDollar 4.9 FrenchFranc
BritishPound 10.0 FrenchFranc
BritishPound 1.99 USDollar
FrenchFranc 0.09 BritishPound
FrenchFranc 0.19 USDollar

0
```

Output:

```
Case 1: Yes
Case 2: No
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