**Algorithms with Python: Regular Exam**

Please submit your solutions (source code) to all below-described problems in [Judge](https://judge.softuni.org/Contests/3592).

**3. Arbitrage**

Arbitrage is the simultaneous purchase and sale of the same asset in order to profit from tiny differences in the asset's listed price. It exploits short-lived variations in the price of identical or similar financial instruments in different markets or in different forms.

You will receive a list of trading pairs and target currency to exploit arbitrage.

Your task is write a program that detects if arbitrage is possible.

## Input

* On the first line you will receive an integer - n - number of the trading pairs.
* On the next n lines you will receive all trading pairs in the following format: "{from\_currency} {to\_currency} {price}".
* On the last line you will receive an integer - t - the target currency for arbitrage.

## Output

* On the first line print if arbitrage is possible: either True or False.
  + If arbitrage is possible print the best path separated by a space.
  + Otherwise, on the next lines, for each currency print the best possible amount that could be collected in the following format: "{currency}: {price}".
  + Price should be formatted to 3 decimal places.
* The order of the output lines doesn't matter.

## Constraints

* The input will always be valid and will follow the format described in the Input section.
* n will always be an integer in the range [1… 50].
* Price for the trading pairs will be positive real numbers in the range [1… 100].
* The target currency will always be a currency from the provided trading pairs.

## Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 5  GBP USD 1.27  USD AUD 1.43  USD NZD 1.51  NZD AUD 0.95  AUD GBP 0.55  GBP | True  GBP USD NZD AUD GBP | 1. Let's say that we start with 1 GBP 2. 1 GBP -> USD = 1.27 USD 3. 1.27 USD -> NZD = 1.27 \* 1.51 = 1.9177 NZD 4. 1.9177 NZD -> AUD = 1.9177 \* 0.95 = 1.821815 AUD 5. 1.821815 AUD -> USD = 1.821815 \* 0.55 = 1.00199825 6. We started with 1 USD and ended with more than that, therefore arbitrage is possible. |
| 5  GBP USD 1.27  USD AUD 1.43  USD NZD 1.51  NZD AUD 0.95  AUD GBP 0.50  GBP | False  GBP: 1.000  USD: 1.270  NZD: 1.918  AUD: 1.822 | 1. Let’s say that we start with 1 GBP 2. 1 GBP -> USD = 1.27 USD 3. 1.27 USD -> NZD = 1.27 \* 1.51 = 1.9177 NZD 4. 1.9177 NZD -> AUD = 1.9177 \* 0.95 = 1.821815 AUD 5. 1.821815 AUD -> USD = 1.821815 \* 0.5 = 0.9109075 6. We started with 1 USD and ended with less than that, therefore arbitrage is not possible. |