Competitive Programming SS24

Submit until end of contest

Problem: trading (1.0 second timelimit)

You made it through the interview process and are happy to become an intern at *Logarithmix Trading Corp.*, a financial trading firm based in the heart of London. The firm's philosophy is deeply rooted in the extensive use of logarithmic laws throughout the tasks and challenges it faces every day.

At 2 o'clock in the morning your Managing Director gives you an assignment: given the pairwise exchange rates between a group of several major currencies, you are tasked to find an infinite money glitch. Let a, b be currencies, let $x_{a\to b}$ be the exchange rate from a to b. As the market is very efficient, it always holds that $x_{a\to b} \cdot x_{b\to a} \leq 1$. Unfortunately, you do not get the actual exchange rate but rather the logarithm of it. This is *Logarithmix Trading Corp.*, remember!

If such an infinite money glitch exists, print it as sequence of currency codes. Assuming you start with the first currency in the sequence and trade each currency for its succeeding one (and the last one back to the first one), you should have more of the first currency after one full run than before.

Input The first line contains $3 \leq n \leq 400$, the number of currencies. The second line contains the list of currency codes, i.e. n 3-letter strings. The following n lines each contain n floating point numbers, constituting the matrix of the logarithms of exchange rates between all currencies. The order corresponds to the one given in the second line.

The exchange rate of a currency to itself is guaranteed to always be 1, i.e. its logarithm is 0. All floating point numbers are guaranteed to have at most four digits behind the decimal point.

Output If no infinite money glitch exists, print `noglitch`. Else, print `money!` in the first line, the number of currencies your glitch involves in the second line, and the names of the currencies in the order you want to trade them in the third line. If multiple infinite money glitches exist, output any of them.

Sample input

```
3
EUR USD JPY
0 0.0663 4.954
-0.0667 0 4.8799
-4.954 -4.8878 0
```

Sample output

```
noglitch
```

```
4
EUR USD JPY SEK
0 0.0663 4.954 2.3509
-0.0667 0 4.8799 2.1944
-4.954 -4.8878 0 -2.6027
-2.3513 -2.1946 2.6027 0
```

```
money!
3
JPY SEK USD
```