4131 - Currency Shopping

Oceania - South Pacific - 2008/2009

After traveling widely over many decades, Bint Fatuma has accumulated a fortune in many different currencies. Now she wants to settle down, to convert her fortune into the local currency and use the money to start a business. It will be beneficial to get the maximum possible amount out of this conversion. After taking little more than a casual look at the exchange rates between different currencies, Bint Fatuma suspects that the most advantageous way for converting one currency into another may not always be the direct way. For instance, if she starts with a Euro, change it into dollars and then converts the dollars into pounds, she may end up with more pounds than by converting a Euro directly into pounds.

Given the set of currencies be c_1, c_2, c_3,..., c_n , available for trading with $r_{i,j}$ being the exchange rate between the two currencies c_i and c_j ,; that is, she can purchase $r_{i,j}$ units of currency c_j in exchange for one unit of currency c_i . You have been assigned the task of helping Bint Famuta by writing a program that finds the most advantageous sequence of currency exchanges for converting one currency into another for a given set of exchange rates. Better yet, if your program can find a sequence of currency exchanges with the property that $r_{a,b}$ * $r_{b,d}$ *...* $r_{h,a}$ > 1 , then she can make a profit by continuously performing this sequence of currency conversions until the bank goes broke!

Input

Input for this problem starts with a positive integer K that represents the number of scenarios on a separate line followed by a description of the K scenarios. $0 < K \leq 20$.

The first line in each scenario consists of a positive integer N that represents the number of the tradable currencies, with $2 \leq N \leq 100$.

The second line consists of N strings that represent the names of the tradable currencies. Each string consists of 3 characters. The strings are separated by single spaces. This is followed by N lines, each containing the exchange rates from one currency. These lines are in the order of the currencies' appearance in the second line described above. In each line the ``to" currencies are also in that order. For instance, in the scenarios in the example input, each second line of exchange rates contains the exchange rates from `USD` into the `FEP`, then to itself (which naturally has the value of 1.0000), then to the `CAD` and finally to the `AUS`. Each of the N line consists of N floating-point numbers that represent currency exchange rates. The value of each number has a positive value that does not exceed the value of fifty and contains four decimal places. The numbers are separated by single spaces.

The last line in each scenario contains two strings. Each string consists of 3 characters and represents a currency. The strings are separated by a single space.

Output

The output consists of one line for each scenario. It will be in one of the following two formats:

1. a number that represents the best exchange rate from the first currency given in the last line of input in this scenario to the second currency given in the last line of input in this scenario. The number must be rounded down (that is, truncated) to the nearest four decimal places, or

2. The string ``Break the bank!"

Sample Input

```
3
4
FEP USD CAD AUS
1.0000 3.7209 3.9070 4.3053
0.2667 1.0000 1.0418 1.1480
0.2536 0.9500 1.0000 1.1019
0.2300 0.8700 0.9050 1.0000
FEP AUS
4
FEP USD CAD AUS
1.0000 3.7209 3.9070 4.1053
0.2667 1.0000 1.0418 1.1480
0.2536 0.9500 1.0000 1.1019
0.2300 0.8700 0.9050 1.0000
FEP AUS
4
FEP USD CAD AUS
1.0000 3.7209 3.9070 4.3053
0.3667 1.0000 1.0418 1.1480
0.2536 0.9500 1.0000 1.1019
0.2300 0.8700 0.9050 1.0000
FEP AUS
```

Sample Output

```
4.3053
4.3051
Break the bank!
```

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