

Problem E

Stochastic Digit Generator

Input: standard input
Output: standard output

A stochastic digit generator (SDG) generates a decimal digit with a certain probability. The probability of the generation of one digit may be different than the other. Suppose this generator is allowed to generate N digits of a number one after another from right to left (least significant to most significant). "What is the probability that this number has a specific remainder when divided by 11?" In this problem you will have to determine such probabilities with some additional constraints.

Input

The input file contains at most **51** blocks of input.

The description of each block starts with an integer **10** in a single line, which indicates that this is a valid input set and the probability of the generation of **10** decimal digits follow. Each of the next **10** lines contains a decimal digit d_i and a floating-point number p_i ($1 \leq i \leq 10$). These lines indicate that the generator generates the digit d_i with probability p_i . Note that values of all d_i will be distinct and $\sum_{i=1}^{10} p_i = 1$. Next line contains an integer Q ($0 < Q < 21$) which indicates the number of queries for this set. Each of the next Q lines contains a format string S_i ($1 \leq i \leq Q$) which actually denotes the format of the generated number followed by an integer r_i ($0 \leq r_i \leq 10$). Each character of the format string will either be an '*' (asterisk) or a decimal digit. An asterisk in a position means that the generator can generate any digit for that position, a decimal digit indicates that for those places the generator doesn't work and generates only that specific digit. The format strings will have maximum **50** characters. The integer r_i denotes that when the generated number is divided by **11** the remainder will be r_i .

Input is terminated by a block whose first line contains a zero.

Output

For each block of input produce $Q+1$ lines of output. The description of output for each block is given below:

The first line contains the serial of the block. Each of the next Q lines contains a floating-point number with eight digits after the decimal point. The i -th floating-point number indicates the probability that the numbers generated according to the format string S_i has remainder r_i when divided by **11**.

Sample Input

```
10
0 0.1
1 0.1
2 0.1
3 0.1
4 0.1
5 0.1
6 0.1
7 0.1
```

Output for Sample Input

```
Case 1:
0.09100000
0.10000000
0.09000000
1.00000000
0.00000000
```

8 0.1	
9 0.1	
5	
*** 0	
12* 0	
1** 0	
121 0	
121 1	
0	

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Special Thanks: Derek Kisman, EPS