Problem H
Dr. Mad Scientist
Input file: ph.txt

Problem Statement

Dr. Mad Scientist invented a device that can predict the performance distribution of an athlete when the detailed data about the athlete is given. This device can solve the inter-galaxy traveling problem the Universe Olympic Committee is facing by using the device to predict the performance of each athlete in different galaxy. You are asked to write a program to report the top three athletes whose chances of winning the championship are the greatest. Given an athlete's vital information, the devise will output a sequence of score and probability pairs. For example, A 0.10 30 0.25 40 0.10 50 0.55 80 means that the athlete A will score 30 with probability 0.10, 40 with probability 0.25, 50 with probability 0.10 and 80 with probability 0.55. Assume that the athletes' performances are independent from each other. Given a sequence of each individual athlete's performance prediction, we can compute the probability of winning for each individual athlete by considering all the possible contest outcomes. For example, given two athletes with the following scores and probabilities:

```
A 0.1 37 0.9 60
B 0.3 45 0.7 60
```

There are 4 possible scenarios to be considered:

A scores 37 while B scores 45 $\rightarrow$ B wins with probability of 0.1*0.3 = 0.03
A scores 37 while B scores 60 $\rightarrow$ B wins with probability of 0.1*0.7 = 0.07
A scores 60 while B scores 45 $\rightarrow$ A wins with probability of 0.9*0.3 = 0.27
A scores 60 while B scores 60 $\rightarrow$ A wins with probability of 0.9*0.7 = 0.63

Therefore, A will win with probability 0.27+0.63=0.9 and B will win with probability 0.03+0.07=0.1. Note that in the 4th scenario above, although the scores for A and B are both 60, as a rule of thumb, since A appears first in the input list, A is given the nod as the winner. In general, given m athletes, with s_1, s_2, …, s_m possible scores for each athletes, respectively, there are $s_1 \times s_2 \times ... \times s_m$ outcome scenarios to consider.

Input File Format

The first line of input file consists of a single number denoting the number of test cases in the file. There is a single line containing a '/' character separating two consecutive test cases. The end of the file is marked with a line containing a '.' character. For each test case, the first line contains an integer m ($m \leq 10$) denoting the number of athletes. In the following m lines, an athletes ID and at least one

probability-score pair is given. The ID, probabilities, and scores are all separated by blank spaces. Please note that ID each ID is a character string with at most four characters, each score is an integer between 0 and 100, each probability is a floating point number between 0 and 1 with at most two digits after the decimal point.

Output Format

For each tournament, output the IDs of the 3 athletes who have the highest winning probabilities, in order of decreasing probability. If there is a tie, the athlete that appears first in the input list should output first.

Sample Input

```
3
4
Abe 0.4 91 0.04 84 0.31 35 0.25 13
Bob 0.05 99 0.22 96 0.54 68 0.04 58 0.15 24
C 0.05 81 0.08 80 0.15 72 0.72 30
Dave 0.18 88 0.06 80 0.44 78 0.09 69 0.23 19
/
4
Able 0.06 65 0.22 59 0.21 40 0.13 27 0.38 22
Blob 0.54 74 0.02 56 0.38 30 0.06 20
Cat 0.21 88 0.47 77 0.12 62 0.2 28
Dog 0.13 80 0.45 77 0.4 21 0.02 16
/
4
Air 0.03 93 0.66 64 0.25 29 0.06 6
Boy 0.1 98 0.07 95 0.34 42 0.49 24
Coke 0.22 85 0.27 73 0.1 71 0.2 62 0.21 5
Zoo 0.15 91 0.15 82 0.16 51 0.19 30 0.35 19
.
```

Sample output

```
Bob Abe Dave
Cat Dog Blob
Coke Zoo Air
```