

**2018/2019 SOUTHERN CALIFORNIA REGIONAL  
INTERNATIONAL COLLEGIATE PROGRAMMING CONTEST**

**Problem 9  
Swamp County Toll Roads**

Swamp County has just completed its first express toll roads. As is now the norm, there are no attended toll booths—all tolls are collected electronically. Rather than issue electronic tags or transponders to road users, toll collection is done based on the automated reading of license plates as vehicles pass through a toll plaza.

For a variety of reasons, sometimes the license plate images are of low quality. When this happens it's possible for license plates to be mis-read, particularly since some characters closely resemble others. The county has studied cases where this has happened and has come up with estimates of the likelihood that a given character will read correctly.

The county would like your team to write a program that will, given the error estimates for individual characters as stated above, take a list of license plates as read and determine the probability that the entire license plate was read correctly.

Input to your program will begin with a list of accuracy estimates. Each estimate consists of the character, a single space, and its estimate of a correct read, in the range  $0 < p < 1$ . For example, the first line of the sample input indicates there is an 88% chance that an "I" read from a license plate is actually an "I". Any characters not in the list are taken as 100% ( $p = 1$ ). You may assume that the reading of one character has no effect on the reading of another character (they are independent). This list ends with an empty line.

The remaining lines of input contain license plates as read, one per line, starting in the first column. Each license plate contains a string of one to eight upper-case letters or digits. The list of license plates ends with end-of-file.

For each license plate, your program is to print a line with the the probability that the license plate was read correctly as a value between zero and one. The value is to be rounded to and printed with three digits after the decimal point. No leading or trailing white space is to appear on an output line.

*Sample Input*

```
I 0.88
1 0.99
0 0.87
0 0.95
Q 0.87
```

```
PROGRAM
ICPC2018
2JKB843
1JKL893
SNU8J5
```

**Problem 9**  
**Swamp County Toll Roads (continued)**

*Output for the Sample Input*

0.870  
0.758  
1.000  
0.990  
1.000