Draft Lottery

Problem ID: draftlottery

Time limit: 2 seconds

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In professional sports, a draft is typically held each year after the end of the season. The draft allows teams to select new players from among the available prospects. The order of selection is often determined using a lottery. A team's odds of getting a draft pick are based on how the team finished during the regular season. The worse a team's record in the regular season, the higher their chance of landing a top pick in the lottery (and strengthening their team before the next season).

Here we describe a novel draft lottery process. Each of the bottom N teams will have their team's logo placed on a certain number of lottery balls (each ball has exactly one team's logo); the i-th worst-ranked team receives b_i ping pong balls in the lottery. If team i had a worse record than team j, then $b_i \geq b_j$.

All ping pong balls are placed in a mixing container and balls are drawn sequentially. The team whose logo is on the first ping pong ball drawn gets the first draft pick. The ball drawn is discarded. A second ball is drawn and the team whose logo is on that ball gets the second draft pick, and so forth. Whenever a ball is drawn for a team that has already received a pick, it is ignored and another ball is drawn in its place.

The first 3 picks are assigned by this lottery drawing. After the top 3 picks have been assigned, the *remaining* teams (those that did not receive a top-3 pick from the drawing) are assigned picks in order from worst record to best.

You've been hired as a consultant by one team's Vice President of Analytics and Strategy to determine the probabilities of each team getting certain picks in order to help the team assess the values of potential trading situations.

Given the counts of ping pong balls that each team will receive in the draft, you must calculate the answers to queries of the form (t, k), meaning, what is the probability that team t receives one of the first k draft picks?

Input

The first line contains an integer N ($3 \leq N \leq 50$), indicating the number of teams in the draft lottery. The next N lines provide the number of lottery balls that each team is allocated. Specifically, the i-th of these N lines contains two values: an integer b_i ($1 \leq b_i \leq 50$) and a string t_i. The team name t_i consists of one to ten uppercase letters. The number of lottery balls for t_i is indicated by b_i. Team names are unique and teams are listed strictly in *worst-to-best* order; for team t_i, listed immediately before team t_{i+1}, it is guaranteed that $b_i \geq b_{i+1}$.

The next line contains an integer Q ($1 \leq Q \leq 200$), the number of probability queries. Next, Q lines follow, each containing one query. Each query line consists of a team name t_j and an integer k_j ($1 \leq k_j \leq N$). The team name in each query is guaranteed to be present in the earlier allocation list.

Output

Output Q lines. Each line should contain the answer to the respective query (in the same order they appear in the input). If the j-th query is t_j and k_j, then the j-th output line should provide the probability of team t_j receiving one of the first k_j draft picks. Each probability must have a *relative error* of less than 10^{-6}.

Sample Input 1

```
3
4 SUNS
2 NUGGETS
1 JAZZ
9
SUNS 1
SUNS 2
SUNS 3
NUGGETS 1
NUGGETS 2
NUGGETS 3
JAZZ 1
JAZZ 2
JAZZ 3
```

Sample Output 1

```
0.571428571
0.895238095
1.0
0.285714286
0.714285714
1.0
0.142857143
0.39047619
1.0
```

Sample Input 2

```
5
13 MAMMOTH
11 KNIGHTS
7 AVALANCHE
5 FLAMES
3 OILERS
9
MAMMOTH 1
MAMMOTH 2
MAMMOTH 3
MAMMOTH 4
MAMMOTH 5
KNIGHTS 1
AVALANCHE 2
FLAMES 3
OILERS 4
```

Sample Output 2

```
0.333333333
0.613999767
0.825377659
1.0
1.0
0.282051282
0.381096028
0.476970929
0.306898614
```