

G Green Light

Sarah is cycling to work. On her way there, she encounters the same traffic light every day. Before she reaches the lights, she alternates between using social media on her mobile device and glancing at the traffic lights, observing if they are green, yellow or red at that time. From experience, she knows that the lights have a fixed green-yellow-red cycle, and how long each stage lasts. So if the light goes from red to green at time T , she knows it will stay green until (but not including) $T + T_g$, then go yellow until (but not including) $T + T_g + T_y$ and finally stay red until (but not including) $T + T_g + T_y + T_r$, at which point it will turn green again. However, she does not know T , the time at which the traffic light cycle starts. Based on her observations, she can deduce what values of T are (im)possible. Assuming that each possible value of T that is consistent with her observations is equally likely, can you compute the probability that the lights will be green at a certain time?



Input

- The first line contains three positive integers T_g T_y T_r , corresponding to the duration (in seconds) for which the lights stay green, yellow, and red ($0 < T_g, T_y, T_r \leq 10^8$).
- The second line contains a single positive integer n , the number of times Sarah looked at the lights ($3 \leq n < 1000$).
- Each of the next n lines contains one integer $0 \leq t \leq 10^9$ followed by a color c : the time (in seconds) of the observation and color of the lights at that moment. Sarah did see the lights being each color (green, yellow and red) at least once.
- The last line contains an integer $0 \leq t_q \leq 10^9$ and a color c_q . These specify the question asked: What is the probability of the lights being of color c_q at time t_q ?

Output

- $0 \leq p \leq 1$, the probability of the lights being color c_q at time t_q . Your answer will be considered correct when it differs from the actual answer by at most 10^{-3} either absolutely or relatively.

Sample Input 1

```
4 4 4
3
2 green
18 yellow
34 red
5 green
```

Sample Output 1

```
0.25
```

Sample Input 2

```
4 4 4
4
2 green
6 yellow
10 red
14 green
4 red
```

Sample Output 2

```
0
```

Sample Input 3

```
6 6 6
6
5 green
6 green
9 yellow
12 yellow
15 red
19 red
7 green
```

Sample Output 3

```
1
```