Code Jam Beta 2008

A. Triangle Trilemma

B. The Price is Wrong

C. Random Route

D. Hexagon Game

Questions asked

Problem C. Random Route

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the Quick-Start Guide to get started.

Small input 30 points	Solve C-small
Large input 30 points	Solve C-large

Problem

Where do you want to go today, and how do you want to get there? You decide to choose the answer to both questions at random.

You will be given a list of roads. Each road connects one city to another city (all roads are one-way), and each road takes a certain amount of time to drive. You will also be given a starting city. Consider all cities that you're able to drive to, not including your starting city, and choose one of them at random with uniform probability to be your destination. Now consider every fastest route from your starting city to your destination city, and choose one of these routes at random with uniform probability. This will be the route on which you end up driving.

For each road in the input, your program must output the probability that you will end up driving on that road, given the behavior outlined above.

Input

The first line of input gives the number of cases, **N**. **N** test cases follow. Each case begins with a line formatted as

```
num_roads starting_city
```

This will be followed by **num_roads** lines, each formatted as

```
city1 city2 time
```

Each line represents a one-way road that starts at `city1` and ends at `city2`, and takes `time` hours to drive. All cities will be formatted as strings consisting of only lowercase letters and underscores. For each road, `city1` will not be equal to `city2`, and `time` will be an integer between 1 and 100000, inclusive. The starting city is guaranteed to appear as `city1` on at least one road; therefore, there will always be at least one possible destination (and at least one shortest route to that destination).

Output

For each test case, output one line containing "Case #**x**: " followed by the probability that you will drive on each road, in the same order that the roads were listed in the input. Probabilities should be space separated and formatted so there are exactly seven digits after the decimal point. Each probability must be within a distance of 1e-6 from the

- Submissions

Triangle Trilemma	
10pt	Not attempted **244/318 users** correct (77%)
10pt	Not attempted **200/260 users** correct (77%)
The Price is Wrong	
15pt	Not attempted **110/175 users** correct (63%)
25pt	Not attempted **67/96 users** correct (70%)
Random Route	
30pt	Not attempted **42/76 users** correct (55%)
30pt	Not attempted **38/51 users** correct (75%)
Hexagon Game	
25pt	Not attempted **8/29 users** correct (28%)
45pt	Not attempted **6/15 users** correct (40%)

- Top Scores

malcin	190
marek.cygan	190
SnapDragon	165
ardiankp	145
Astein	130
rem	130

RAVEman	120
yuhch123	120
Lovro	120
lukasP	120

correct answer to be judged as correct.

Limits

1 ≤ **N** ≤ 100.

Small dataset

2 ≤ **num_roads** ≤ 25.

Large dataset

2 ≤ **num_roads** ≤ 50.

Sample

Input

```
1
5 san_francisco
san_francisco los_angeles 6
los_angeles san_diego 2
san_francisco san_diego 8
los_angeles san_diego 2
san_francisco los_angeles 6
```

Output

```
Case #1: 0.4500000 0.200000
```