

Practice Problems

[A. Alien Numbers](#)

[B. Always Turn Left](#)

[C. Egg Drop](#)

**D. Shopping Plan**

[Questions asked](#)

Submissions

Alien Numbers

40pt Not attempted  
320/432 users correct (74%)

80pt Not attempted  
271/338 users correct (80%)

Always Turn Left

40pt Not attempted  
108/135 users correct (80%)

80pt Not attempted  
96/114 users correct (84%)

Egg Drop

40pt Not attempted  
56/82 users correct (68%)

80pt Not attempted  
26/53 users correct (49%)

Shopping Plan

40pt Not attempted  
43/67 users correct (64%)

80pt Not attempted  
16/52 users correct (31%)

Top Scores

sclo	480
jdmetz	480
lordmonsoon	480
ardiankp	480
krijgertje	480
ilyakor	400
Edu	400
Jonick	400
zibada	400
gpascale	400

Problem D. Shopping Plan

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  
40 points

Solve D-small

Large input  
80 points

Solve D-large

Problem

You have a list of items you need to buy today, and you know the locations (represented as points on a cartesian grid) of a few stores in the area. You also know which of these stores are selling each item on your list, and at what price each store sells it. Given the price of gas, what is the minimum amount you need to spend in order to buy all the items on your shopping list and then drive back home? You start and end the journey at your house, which is located at (0,0).

To make matters interesting, some of the items on your list may be perishable. Whenever you make a purchase that includes one or more perishable items, you cannot drive to another store without first stopping back at your house. Every item on your shopping list is guaranteed to be sold by at least one store, so the trip will always be possible.

Input

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

num\_items num\_stores price\_of\_gas

The next line contains the **num\_items** items on your shopping list. The items will be space separated, and each item will consist of only lowercase letters. If an item is perishable, its name will be followed by a single exclamation point. There will be no duplicate items on your list. The next **num\_stores** lines will each be formatted as

x\_pos y\_pos item1:price1 item2:price2 ...

Each of these lines gives the location of one store, along with the items available at that store and their corresponding prices. Only items which are on your shopping list will appear in these lists. Perishable items will not end with exclamation points on these lists. No item will be repeated in a store's list. Each store will offer at least one item for sale. No two stores will be at the same location, and no store will be located at (0,0).

Output

For each test case, output one line containing "Case #x: " followed by the minimum possible cost of the trip, rounded to seven decimal places. Don't forget about **price\_of\_gas**, which is the amount of money you must spend per unit distance that you drive.

Limits

1 ≤ **N** ≤ 100,  
0 ≤ **price\_of\_gas** ≤ 1000,  
-1000 ≤ **x\_pos** ≤ 1000,  
-1000 ≤ **y\_pos** ≤ 1000,  
1 ≤ price of each item ≤ 1000.

Small dataset

1 ≤ **num\_items** ≤ 5,  
1 ≤ **num\_stores** ≤ 10.

Large dataset

1 ≤ **num\_items** ≤ 15,  
1 ≤ **num\_stores** ≤ 50.

Sample

Input	Output
2	Case #1: 400.0000000
1 2 10	Case #2: 519.2920690
cookies	

```
0 2 cookies:400
4 0 cookies:320
3 3 5
cookies milk! cereal
0 2 cookies:360 cereal:110
4 0 cereal:90 milk:150
-3 -3 milk:200 cookies:200
```

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