

TBS Problem



Quality Blimps Inc. is looking to expand their sales to other cities (N), so they hired you as a salesman to fly to other cities to sell blimps. Blimps can be expensive to travel with, so you will need to determine how many blimps to take along with you on each trip and when to return to headquarters to get more. Quality Blimps has an unlimited supply of blimps.

You will be able to sell only one blimp in each city you visit, but you do not need to visit every city, since some have expensive travel costs. Each city has an initial price that blimps sell for, but this goes down by a certain percentage as more blimps are sold (and the novelty wears off). Find a good route that will maximize profits.

Details

Blimp Decline - The blimps will decline (D) in price every time you visit **10%** of the cities (the number of cities will always be a multiple of **10**). For example, if D is **.95** and there are **10** cities, then for every city you visit (except headquarters), the price of blimps will be multiplied by **.95**. So after **5** visits, every city's blimp price will be about **77%** of the initial value ($.95^5$).

Note that if the price declines after you visit some city, then it will only happen *after* you made the sale on that city, so your sale on that city will not be affected. In particular, each blimp you sell in the first **10%** of the cities will always be sold at their corresponding city's initial price.

Input Format

The first line of input for each test case will contain three parameters:

- number of cities (N)
- blimp cost per mile (C)
- blimp factor of decline (D)

This will be followed by N lines, which will each contain three integers x_i, y_i, p_i , the city location (x and y coordinates the grid, in miles) and the initial blimp sales price, respectively.

Constraints

- $10 \leq N \leq 10^5$
- $0.2 \leq C \leq 4$
- $0.5 \leq D \leq 0.99$
- $-10^3 \leq x_i \leq 10^3$
- $-10^3 \leq y_i \leq 10^3$
- $p_i < 10^5$
- The city locations will be distinct

Output Format

On each line, output the x and y coordinates of the next city you are visiting. When leaving the headquarters, also output the number of blimps you are taking with you for that part of the trip. You do not need to return to headquarters when you finish your sales.

You can only visit each city at most once.

Sample Input

```
10 3 0.95
1 1 30
2 2 35
0 8 50
7 2 20
7 3 25
10 7 90
9 8 35
5 15 10
8 18 15
1 9 60
```

Sample Output

```
1 1 2
2 2
0 0
10 7 2
9 8
0 0
0 8 2
1 9
```

Explanation

The salesman first travels a distance of $\sqrt{2}$ dollars to (1,1) carrying 2 blimps. This will cost him $\sqrt{2}$ dollars for his own travel and $6\sqrt{2}$ dollars for the 2 blimps. He will then earn 30 dollars selling 1 blimp. He then continues to (2,2) with only 1 blimp, which will cost him $1\sqrt{2}$ dollars for his travel and $3\sqrt{2}$ dollars for his blimp. He will then earn 33.25 dollars selling the blimp, since the prices have declined by 5%. After his return to HQ (a distance of $2\sqrt{2}$) he will have earned an approximate profit of 44.87 dollars.

Scoring

The goal of this challenge is to achieve the maximum profit on each test case. Your profits for each test case will be:

$$\text{Total Blimp Sales} - \text{Total Travel Costs}$$

You will receive a score for each test case based on the ratio of your profit to the estimated maximum profit. Your total score for this challenge will be a weighted sum of your scores for each test case. If your profit is negative, you'll receive a zero score.