# 5Mushroom Gnomes - 2

time limit per test

1 second

memory limit per test

256 megabytes

One day Natalia was walking in the woods when she met a little mushroom gnome. The gnome told her the following story:

Everybody knows that the mushroom gnomes' power lies in the magic mushrooms that grow in the native woods of the gnomes. There are *n* trees and *m* magic mushrooms in the woods: the *i*-th tree grows at a point on a straight line with coordinates *ai* and has the height of *hi*, the *j*-th mushroom grows at the point with coordinates *bj* and has magical powers *zj*.

But one day wild mushroommunchers, the sworn enemies of mushroom gnomes unleashed a terrible storm on their home forest. As a result, some of the trees began to fall and crush the magic mushrooms. The supreme oracle of mushroom gnomes calculated in advance the probability for each tree that it will fall to the left, to the right or will stand on. If the tree with the coordinate *x* and height *h* falls to the left, then all the mushrooms that belong to the right-open interval [*x* - *h*, *x*), are destroyed. If a tree falls to the right, then the mushrooms that belong to the left-open interval (*x*, *x* + *h*] are destroyed. Only those mushrooms that are not hit by a single tree survive.

Knowing that all the trees fall independently of each other (i.e., all the events are mutually independent, and besides, the trees do not interfere with other trees falling in an arbitrary direction), the supreme oracle was also able to quickly calculate what would be the expectation of the total power of the mushrooms which survived after the storm. His calculations ultimately saved the mushroom gnomes from imminent death.

Natalia, as a good Olympiad programmer, got interested in this story, and she decided to come up with a way to quickly calculate the expectation of the sum of the surviving mushrooms' power.

**Input**

The first line contains two integers *n* and *m* (1 ≤ *n* ≤ 105, 1 ≤ *m* ≤ 104) — the number of trees and mushrooms, respectively.

Each of the next *n* lines contain four integers — *ai*, *hi*, *li*, *ri* (|*ai*| ≤ 109, 1 ≤ *hi* ≤ 109, 0 ≤ *li*, *ri*, *li* + *ri* ≤ 100) which represent the coordinate of the *i*-th tree, its height, the percentage of the probabilities that the tree falls to the left and to the right, respectively (the remaining percentage is the probability that the tree will stand on).

Each of next *m* lines contain two integers *bj*, *zj* (|*bj*| ≤ 109, 1 ≤ *zj* ≤ 103) which represent the coordinate and the magical power of the *j*-th mushroom, respectively.

An arbitrary number of trees and mushrooms can grow in one point.

**Output**

Print a real number — the expectation of the total magical power of the surviving mushrooms. The result is accepted with relative or absolute accuracy 10- 4.

**Examples**

**Input**

**Copy**

1 1  
2 2 50 50  
1 1

**Output**

**Copy**

0.5000000000

**Input**

**Copy**

2 1  
2 2 50 50  
4 2 50 50  
3 1

**Output**

**Copy**

0.2500000000

**Note**

It is believed that the mushroom with the coordinate *x* belongs to the right-open interval [*l*, *r*) if and only if *l* ≤ *x* < *r*. Similarly, the mushroom with the coordinate *x* belongs to the left-open interval (*l*, *r*] if and only if *l* < *x* ≤ *r*.

In the first test the mushroom survives with the probability of 50%, depending on where the single tree falls.

In the second test the mushroom survives only if neither of the two trees falls on it. It occurs with the probability of 50%  ×  50% = 25%.

Pretest №12 is the large test with 105 trees and one mushroom.

题意：现在有n棵树，m棵蘑菇。给定每棵树的位置ai，高度bi，以及向左倒的概率li，覆盖区间[ai-hi,ai)向右倒的概率ri，覆盖区间为(ai,ai+hi]。给定每棵蘑菇的位置和魔法值，如果蘑菇被一颗或者多棵树覆盖，则其魔法值变为0，要求这些蘑菇魔法值的期望值。

# Glass Carving

time limit per test

2 seconds

memory limit per test

256 megabytes

Leonid wants to become a glass carver (the person who creates beautiful artworks by cutting the glass). He already has a rectangular *w* mm  ×  *h* mm sheet of glass, a diamond glass cutter and lots of enthusiasm. What he lacks is understanding of what to carve and how.

In order not to waste time, he decided to practice the technique of carving. To do this, he makes vertical and horizontal cuts through the entire sheet. This process results in making smaller rectangular fragments of glass. Leonid does not move the newly made glass fragments. In particular, a cut divides each fragment of glass that it goes through into smaller fragments.

After each cut Leonid tries to determine what area the largest of the currently available glass fragments has. Since there appear more and more fragments, this question takes him more and more time and distracts him from the fascinating process.

Leonid offers to divide the labor — he will cut glass, and you will calculate the area of the maximum fragment after each cut. Do you agree?

**Input**

The first line contains three integers *w*, *h*, *n* (2 ≤ *w*, *h* ≤ 200 000, 1 ≤ *n* ≤ 200 000).

Next *n* lines contain the descriptions of the cuts. Each description has the form *H* *y* or *V* *x*. In the first case Leonid makes the horizontal cut at the distance *y* millimeters (1 ≤ *y* ≤ *h* - 1) from the lower edge of the original sheet of glass. In the second case Leonid makes a vertical cut at distance *x* (1 ≤ *x* ≤ *w* - 1) millimeters from the left edge of the original sheet of glass. It is guaranteed that Leonid won't make two identical cuts.

**Output**

After each cut print on a single line the area of the maximum available glass fragment in mm2.

**Examples**

**Input**

**Copy**

4 3 4  
H 2  
V 2  
V 3  
V 1

**Output**

**Copy**

8  
4  
4  
2

**Input**

**Copy**

7 6 5  
H 4  
V 3  
V 5  
H 2  
V 1

**Output**

**Copy**

28  
16  
12  
6  
4

**Note**

Picture for the first sample test:



Picture for the second sample test:



题意：给出一个n\*m的矩阵，对该矩形进行n次切割，可以是横向切割或纵向切割，求每一次切割后的最大矩形的面积。