We all probably know how to find equation of bisectors in Coordinate Geometry. If the equations of two lines are $a_i x + b_i y + c_i = 0$ and $a_j x + b_j y + c_j = 0$, then the equations of the bisectors of the four angles they create are given by

$$\frac{a_i x + b_i y + c_i}{\sqrt{a_i^2 + b_i^2}} = \pm \frac{a_j x + b_j y + c_j}{\sqrt{a_j^2 + b_j^2}}$$

Now one has to be quite intelligent to find out for which angles to choose the '+' (plus) sign and for which angles to choose the '−' (minus) sign. You will have to do similar sort of choosing in this problem. Suppose there is a fixed point (C_x, C_y) and there are n ($n \le 10000$) other points around it. No two points from these n points are collinear with (C_x, C_y). If you connect all these point with (C_x, C_y) you will get a star-topology like image made of n lines. The equations of these n lines are also given and only these equations must be used when finding the equation of bisectors. This n lines create $n(n-1)/2$ acute or obtuse angles in total and so they have total $n(n-1)/2$ bisectors. You have to find out how many of these bisectors have equations formed using the '+' sign. The image below shows an image where $n = 5$, $C_x = 5$ and $C_y = 2$. This image corresponds to the only sample input.

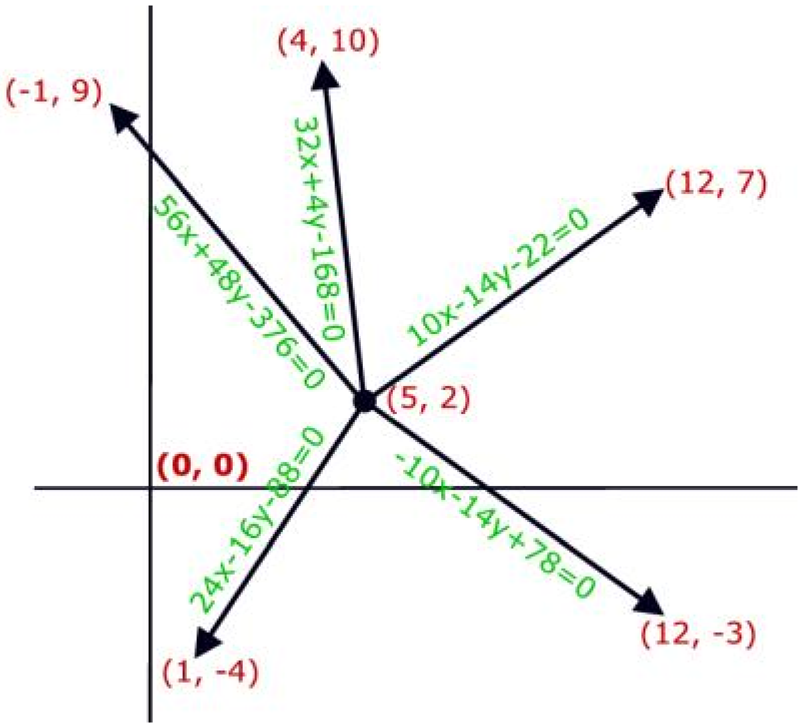

Figure: Five lines above create $5(5-1)/2 = 10$ angles and these angles has 10 bisectors. Of these 10 bisectors, the equation of only 4 are formed using the '+' sign of the formula

$$\frac{a_i x + b_i y + c_i}{\sqrt{a_i^2 + b_i^2}} = \pm \frac{a_j x + b_j y + c_j}{\sqrt{a_j^2 + b_j^2}}$$

Input

The input file contains maximum 35 sets of inputs. The description of each set is given below:

First line of each set contains three integers C_x, C_y ($-10000 \le C_x, C_y \le 10000$) and n ($0 \le n \le 10000$). Each of the next n lines contains two integers x_i, y_i ($-20000 \le x_i, y_i \le 20000$) and a string of the form $a_i x + b_i y + c_i = 0$. Here (x_i, y_i) is the coordinate of a point around (C_x, C_y) and the string denotes the equation of the line segment formed by connecting (C_x, C_y) and (x_i, y_i). You can assume that ($-100000 \le a_i, b_i \le 100000$) and ($-2000000000 \le c_i \le 2000000000$). This equation will actually be used to find the equations of bisectors of the angles that this line creates.

Input is terminated by a set where the value of n is zero.

Output

For each set of input produce one line of output. This line contains an integer number P that denotes of the $\frac{n(n-1)}{2}$ bisector equations how many are formed using the '+' sign in the bisector equation

$$\frac{a_i x + b_i y + c_i}{\sqrt{a_i^2 + b_i^2}} = \pm \frac{a_j x + b_j y + c_j}{\sqrt{a_j^2 + b_j^2}}$$

Sample Input

```
5 2 5
12 7 10x-14y-22=0
1 -4 24x-16y-88=0
4 10 32x+4y-168=0
-1 9 56x+48y-376=0
12 -3 -10x-14y+78=0
10 10 0
```

Sample Output

```
4
```