ETH Zurich
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HS 2015
Exercise Sheet 1

ACM Programming Challenges Lab

Exercise 1 – *Hidden stars*

Sometimes, Paul looks up into the sky wondering how many stars are hiding behind other stars.

Your task is to compute the number of stars that are hidden behind some other star. You get a 2D map with Pauls location p and the coordinates of n stars $s_1, \ldots, s_n$. A star s_i is hidden behind a star s_j if s_j lies on the line segment $[p, s_i]$.

Input The first line of the input contains the number $1 \leq T \leq 20$ of test cases. Each of the c test cases is described as follows:

- The first line contains one integer n, where n is the number of points ($1 \leq n \leq 10^5$).

- The second line contains two integers x and y, indicating the coordinates of Pauls location ($0 \leq x, y < 2^{31}$).

- Thereafter, n lines follow, each containing two integers x_i and y_i, indicating the coordinates of star i ($0 \leq x_i, y_i < 2^{31}$). No two stars have the same coordinates, and there is no star with the same coordinates as Paul's location.

Output For each test case, print one line of output containing the number of stars that are hidden behind some other star.

Points There are two test sets, worth 100 points in total.

1. For the first test set, worth 50 points, you may assume $n \leq 10^3$.

2. For the second test set, worth 50 points, there are no additional assumptions.

Sample Input
```
2
5
1 1
1 2
1 4
1 0
2 1
3 1
2
0 0
1 1
2 2
```

Sample Output
```
2
1
```