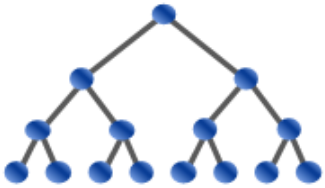

USACO 2022 February Contest, Silver
Problem 2. Robot Instructions

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Contest has ended.

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English (en)

Bessie is learning how to control a robot she has recently received as a gift.

The robot begins at point $(0, 0)$ on the coordinate plane and Bessie wants the robot to end at point (x_g, y_g). Bessie initially has a list of N ($1 \le N \le 40$) instructions to give to the robot, the i-th of which will move the robot x_i units right and y_i units up (or left or down when x_i and y_i are negative, respectively).

For each K from 1 to N, help Bessie count the number of ways she can select K instructions from the original N such that after the K instructions are executed, the robot will end at point (x_g, y_g).

****Note: the time and memory limits for this problem are 4s and 512MB, twice the defaults.****

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains N. The next line contains x_g and y_g, each in the range $-10^9 \ldots 10^9$. The final N lines describe the instructions. Each line has two integers x_i and y_i, also in the range $-10^9 \ldots 10^9$.

It is guaranteed that $(x_g, y_g) \neq (0, 0)$ and $(x_i, y_i) \neq (0, 0)$ for all i.

OUTPUT FORMAT (print output to the terminal / stdout):

Print N lines, the number of ways Bessie can select K instructions from the original N for each K from 1 to N.

SAMPLE INPUT:

```
7
5 10
-2 0
3 0
4 0
5 0
0 10
0 -10
0 10
```

SAMPLE OUTPUT:

```
0
2
0
3
0
1
0
```

In this example, there are six ways Bessie can select the instructions:

```
(-2,0) (3,0) (4,0) (0,10) (0,-10) (0,10) (1 2 3 5 6 7)
(-2,0) (3,0) (4,0) (0,10) (1 2 3 5)
(-2,0) (3,0) (4,0) (0,10) (1 2 3 7)
(5,0) (0,10) (0,-10) (0,10) (4 5 6 7)
(5,0) (0,10) (4 5)
(5,0) (0,10) (4 7)
```

For the first way, the robot's path looks as follows:

```
(0,0) -> (-2,0) -> (1,0) -> (5,0) -> (5,10) -> (5,0) -> (5,10)
```

SCORING:

- Test cases 2-4 satisfy $N \leq 20$.
- Test cases 5-16 satisfy no additional constraints.

Problem credits: Alex Liang

Contest has ended. No further submissions allowed.