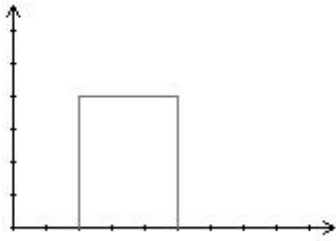


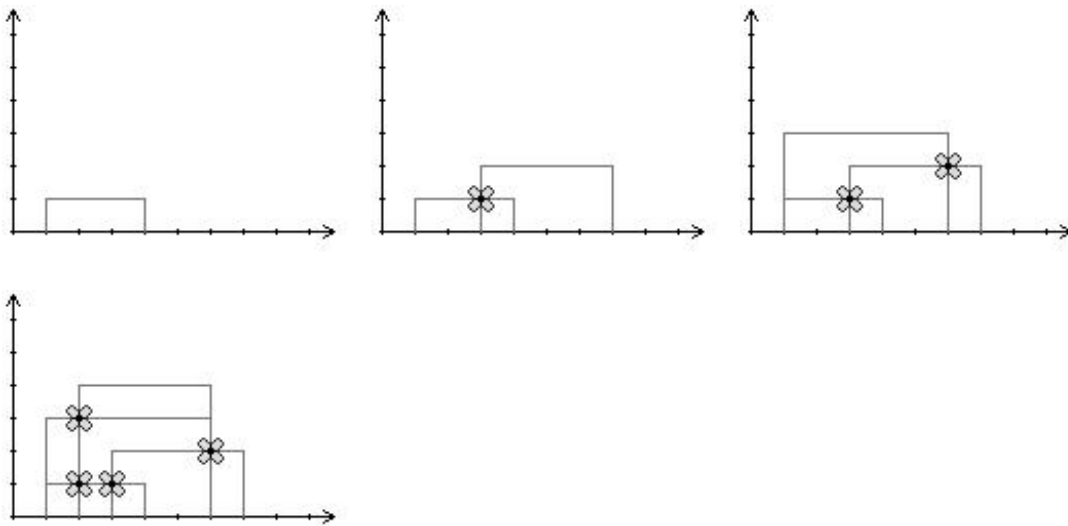
Cvjetici

On a faraway planet, strange plants with two stems can be found. Every plant on the planet can be described by three numbers: the x-coordinates of the stems L and R , and the height H at which the stems are connect. The image depicts a plant with $L=2$, $R=5$ and $H=4$.



Every day a new plant grows on the planet. The plant that grows on day 1 is of height 1, and every subsequent plant is one higher than the previous one.

When a stem of a new plant intersects the horizontal segment of another plant, a small flower grows (if one wasn't there already). If segments merely touch in a point, a flower will not grow there. The following images are a visualization of the first example.



Write a program that, given the coordinates of all plants, calculates the number of new flower every day.

Input

The first line contains an integer N ($1 \leq N \leq 100\,000$), the number of days.

Each of the following N lines contains two integers L and R ($1 \leq L < R \leq 100\,000$), the coordinates of the stems of a plant.

Output

Output N lines, the number of new flowers after each plant grows.

Example

Input

4

1 4

3 7

1 6

2 6

Output

0

1

1

2

Input

5

1 3

3 5

3 9

2 4

3 8

Output

0

0

0

3

2