C. Fox Families (foxfamilies)

A large area in the Alps has recently been declared a nature reserve. In the beginning, there were no foxes in the reserve. However, the fox population in the nature reserve has been recovering day by day thanks to ongoing conservation measures. Every day, a new fox arrives. Biologist Simona is observing the recovery process, and she is interested in the number of distinct families that the foxes form at any point in time. Simona knows that each fox i has a hunting territory that can be represented by a segment $[L_i, R_i]$ with $L_i < R_i$. These territories may overlap or even be contained within each other. From her studies, Simona knows that two foxes i and j are *direct relatives* if one of their hunting territories is nested within the other (either $L_i \leq L_j < R_j \leq R_i$ or $L_j \leq L_i < R_i \leq R_j$). Two foxes belong to the same *family* if and only if either they are directly related or they are connected through a chain of directly related foxes.[1]

Fox i ($0 \leq i \leq N-1$) arrives on day i and remains in the reserve from then on, keeping the same hunting territory $[L_i, R_i]$ forever. The arrival of each fox may or may not change the family relations. After each day, Simona wants to know the number of fox families after fox i has arrived.

Input

The first line of the input contains a single integer N, the number of days. The following N lines contain two integers each, L_i and R_i, describing the hunting territory of fox i.

Output

Output N lines. Line i (for $0 \leq i \leq N-1$) should contain a single integer, the number of fox families that existed after fox i arrived.

Constraints

- $1 \leq N \leq 100\,000$.
- $0 \leq L_i < R_i \leq 200\,000$.
- No pair (L_i, R_i) will appear more than once.

Scoring

Your program will be tested on several test cases grouped into subtasks. To obtain the score for a subtask, you must correctly solve all the tests it contains.

- **Subtask 0 [0 points]**: Examples.
- **Subtask 1 [10 points]**: $N \leq 100$.
- **Subtask 2 [15 points]**: $N \leq 2000$.
- **Subtask 3 [16 points]**: $R_i - L_i \leq 2$.
- **Subtask 4 [23 points]**: $L_i < L_{i+1}$.
- **Subtask 5 [36 points]**: No additional constraints.

[1] Formally, two foxes a and b are in the same family if and only if there exists a sequence of foxes $c_0, c_1, ...c_{m-1}$ such that $a = c_0$ and $b = c_{m-1}$, and c_i is directly related to c_{i+1} for every $0 \leq i < m-1$.

Examples

stdin	stdout
4 1 4 3 6 3 4 6 7	1 2 1 2
6 0 1 1 2 2 3 3 4 4 5 2 4	1 2 3 4 5 4
5 0 5 1 4 2 7 3 6 4 5	1 1 2 2 1

Explanation

The first example satisfies the constraints of subtasks 1, 2, and 5. The second example satisfies the constraints of subtasks 1, 2, 3, and 5. The third example satisfies the constraints of subtasks 1, 2, 4, and 5.

First Example. After the first fox arrives, there is one family. After the second fox arrives, there are two families, since $[1, 4]$ and $[3, 6]$ overlap but neither territory contains the other. Then the fox with territory $[3, 4]$ arrives: it is contained in both $[1, 4]$ and $[3, 6]$, so these two families merge and the number of families is now 1. Finally, the fox with territory $[6, 7]$ does not contain any previous territory and is not contained within any of them, so it forms a new family and the number of families is now 2.