Problem H. Nested Ranges Check

Time limit   1000 ms
Mem limit   524288 kB

Given n ranges, your task is to determine for each range if it contains some other range and if some other range contains it.

Range $[a, b]$ contains range $[c, d]$ if $a \leq c$ and $d \leq b$.

Input

The first input line has an integer n: the number of ranges.

After this, there are n lines that describe the ranges. Each line has two integers x and y: the range is $[x, y]$.

You may assume that no range appears more than once in the input.

Output

First print a line that describes for each range (in the input order) if it contains some other range (1) or not (0).

Then print a line that describes for each range (in the input order) if some other range contains it (1) or not (0).

Constraints

- $1 \leq n \leq 2 \cdot 10^5$
- $1 \leq x < y \leq 10^9$

Sample

Input	Output
4 1 6 2 4 4 8 3 6	1 0 0 0 0 1 0 1