Problem A. Writing Lab 1 Together

- 2023.10.07 02:00 Update: Strengthened testcases and rejudged solutions.
- 2023.10.07 02:00 Update: Added subtask for $n \leq 1000$.
- 2023.10.06 17:40 Update: Added sample 3.

Problem Description

In the "Introduction to Algorithms" class, there are n students, each assigned to work on Lab 1 within a specified time range from ℓ_i to r_i.

Recognizing that Lab 1 can pose challenges for students who are just starting, they may engage in discussions with their classmates.

For each student s_i, two questions arise:

- First, is there any student s_j who can be found by s_i during all of s_j's working hours?
- Second, is there a specific classmate whom s_i can find to discuss Lab 1 at any time during s_i's work period?

Input Format

The input consists of several lines.

The first line contains an integer: n, indicating the number of students in "Introduction to Algorithms."

The next n lines contain two integers each: ℓ_i and r_i, representing the work period of the i^{th} student.

Output Format

Print a line with n integers. The i^{th} integer is 1 if the answer to the first question for student s_i is true; otherwise, it is 0.

Then, print another line with n integers. The i^{th} integer is 1 if the answer to the second question for student s_i is true; otherwise, it is 0.

Constraints

- $1 \leq n \leq 200\,000$.
- $1 \leq \ell_i < r_i \leq 10^9$ for $i = 1, 2, \ldots, n$.
- All input values are integers.

Subtasks

1. (30 points) $n \leq 1000$.
2. (70 points) No additional constraints.

No.	Testdata Range	Time Limit (ms)	Memory Limit (KiB)
Samples	1-3	1000	262144
1	1-15	1000	262144
2	1-28	1000	262144

Samples

Sample Input 1

```
4
1 6
2 4
4 8
3 6
```

This sample input satisfies the constraints of all the subtasks.

Sample Output 1

```
1 0 0 0
0 1 0 1
```

Sample Input 2

```
4
1 1000000000
2 999999999
2 999999999
3 999999998
```

This sample input satisfies the constraints of all the subtasks.

Sample Output 2

```
1 1 1 0
0 1 1 1
```

Sample Input 3

```
2
1 2
1 2
```

This sample input satisfies the constraints of all the subtasks.

Sample Output 3

```
1 1
1 1
```

The two students can find each other to discuss Lab 1.