CSES Problem Set

Nested Ranges Check

Time limit: 1.00 s **Memory limit:** 512 MB

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

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

Example

Input:
```
4
1 6
2 4
4 8
3 6
```

Output:

Sorting and Searching

...
Traffic Lights -
Josephus Problem I -
Josephus Problem II -
Nested Ranges Check -
Nested Ranges Count -
Room Allocation -
Factory Machines -
Tasks and Deadlines -
...

Your submissions

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