

# Drawing Rectangles



An art student decides to draw rectangles. The drawing paper is divided into cells, and every cell has its own coordinates. Coordinates are defined such that the bottom-left cell has coordinates  $(0, 0)$  and the upper-right cell has coordinates  $(3 \times 10^5, 3 \times 10^5)$ .

Of the rectangles drawn, each rectangle is as follows: First, two cells with coordinates  $(x_1, y_1)$  and  $(x_2, y_2)$  are chosen in such a way, that  $x_1 \leq x_2$  and  $y_1 \leq y_2$ . Then, all cells in the rectangle are painted with bottom-left cell  $(x_1, y_1)$  and top-right cell  $(x_2, y_2)$ .

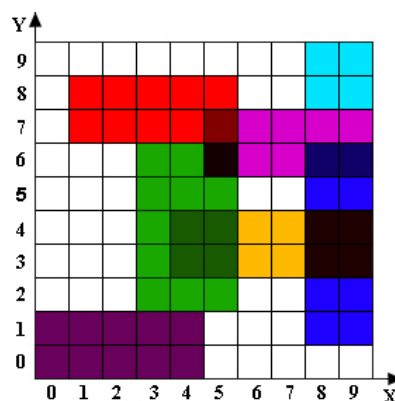
It is guaranteed that the total number of colored cells is not larger than  $3 \times 10^5$ .

After drawing all rectangles, the student decides to erase the whole drawing. The student can clear all cells in one row or all cells in one column in exactly one minute.

You are given the coordinates of the rectangles that were drawn. You need to choose which rows and columns to erase to clear all cells in the least possible time.

The following picture illustrates a few rectangles.

- purple with coordinates  $(0, 0)$ ,  $(4, 1)$
- green with coordinates  $(3, 2)$ ,  $(5, 6)$
- yellow with coordinates  $(4, 3)$ ,  $(9, 4)$
- blue with coordinates  $(8, 1)$ ,  $(9, 6)$
- red with coordinates  $(1, 7)$ ,  $(5, 8)$
- pink with coordinates  $(5, 6)$ ,  $(9, 7)$
- cyan with coordinates  $(8, 8)$ ,  $(9, 9)$



## Input Format

The first line contains a single integer  $n$ , denoting the number of rectangles.

The next  $n$  lines contain four numbers  $x_{1,i}$ ,  $y_{1,i}$ ,  $x_{2,i}$ ,  $y_{2,i}$ , which denotes coordinates of bottom-left and upper-right cells of the  $i^{\text{th}}$  rectangle.

## Constraints

- $1 \leq n \leq 3 \times 10^5$
- $0 \leq x_{1,i}, y_{1,i}, x_{2,i}, y_{2,i} \leq 3 \times 10^5$

- The total number of cells in the union of all rectangles  $\leq 3 \times 10^5$

### Output Format

On the first line, print an integer denoting the minimum amount of time needed to clear all cells, in minutes.

On the next line, print an integer  $t_c$  denoting the number of columns that should be cleared. On the next line, print  $t_c$  space-separated integers denoting the coordinates of the columns that should be cleared. If  $t_c = 0$ , print an empty line.

On the next line, print an integer  $t_r$  denoting the number of rows that should be cleared. On the next line, print  $t_r$  space-separated integers denoting the coordinates of the rows that should be cleared. If  $t_r = 0$ , print an empty line.

If there are multiple ways to clear all cells in the minimum amount of time, you may print any one of them.

### Sample Input 0

```
1
0 0 1 0
```

### Sample Output 0

```
1
0

1
0
```

### Explanation 0

In this case, we can erase the row with coordinate **0** to clear all colored cells in **1** minute.

### Sample Input 1

```
2
0 0 2 0
1 0 1 2
```

### Sample Output 1

```
2
1
1
1
1
0
```

### Explanation 1

In this case, we can erase the row with coordinate **0** and the column with coordinate **1**.

### Sample Input 2

```
7
0 0 4 1
3 2 5 6
4 3 9 4
8 1 9 6
1 7 5 8
5 6 9 7
8 8 9 9
```

Sample Output 2

```
10
10
0 1 2 3 4 5 6 7 8 9
0
```