

Contest Duration: 2025-11-29(Sat) 23:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251129T2100&p1=248>) - 2025-11-30(Sun) 00:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251129T2240&p1=248>) (local time) (100 minutes)

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D - Clouds

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 425 points

Problem Statement

The sky is represented by a 2000×2000 grid.

When looking up at the sky, the cell at the r -th row from the top and c -th column from the left is called (r, c) .

Currently, there are clouds $1, 2, \dots, N$ floating in this sky.

The cell (r, c) is covered by cloud i if and only if it satisfies $U_i \leq r \leq D_i$ and $L_i \leq c \leq R_i$

For $k = 1, 2, \dots, N$, answer the following question:

- Remove only cloud k from the N clouds. At this point, there are $N - 1$ clouds floating in the sky. How many cells are not covered by any cloud?

Constraints

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq U_i \leq D_i \leq 2000$
- $1 \leq L_i \leq R_i \leq 2000$
- All input values are integers.

Input

The input is given from Standard Input in the following format:

```
N  
U1 D1 L1 R1  
U2 D2 L2 R2  
:  
UN DN LN RN
```

Output

Output N lines.

The i -th line should contain the answer to the question when $k = i$.

Sample Input 1

Copy

```
5  
2 4 1 4  
3 3 3 5  
1 3 4 6  
4 5 3 5  
5 5 4 6
```

Copy

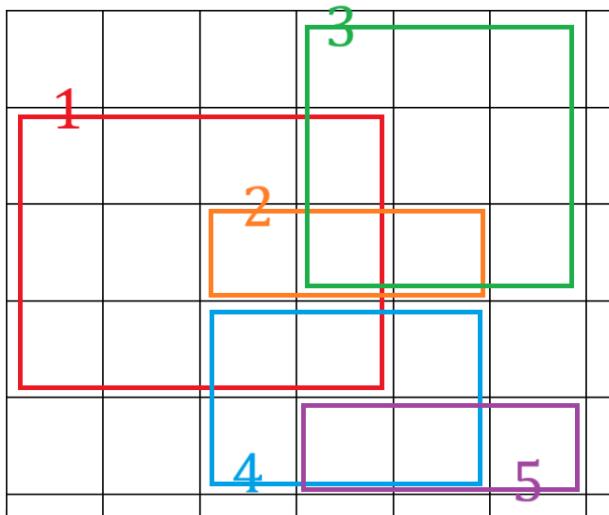
Sample Output 1

Copy

```
3999983  
3999976  
3999982  
3999978  
3999977
```

Copy

The figure shows the top-left 5×6 region of the sky.



- When cloud 1 is removed, the number of cells covered by some cloud is 17, so the number of cells not covered by any cloud is 3999983.
- When cloud 2 is removed, the number of cells covered by some cloud is 24, so the number of cells not covered by any cloud is 3999976.
- When cloud 3 is removed, the number of cells covered by some cloud is 18, so the number of cells not covered by any cloud is 3999982.
- When cloud 4 is removed, the number of cells covered by some cloud is 22, so the number of cells not covered by any cloud is 3999978.
- When cloud 5 is removed, the number of cells covered by some cloud is 23, so the number of cells not covered by any cloud is 3999977.

#telegram)

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