D - Clouds

Editorial (/contests/abc434/tasks/abc434_d/editorial)

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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 $1, 2, \ldots, N$ 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 $k = 1, 2, \ldots, N$, 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:

$$
\begin{aligned}
&N \\
&U_1 \quad D_1 \quad L_1 \quad R_1 \\
&U_2 \quad D_2 \quad L_2 \quad R_2 \\
&\vdots \\
&U_N \quad D_N \quad L_N \quad R_N
\end{aligned}
$$

Output

Output N lines.

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

Sample Input 1 Copy

Copy

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

Sample Output 1 Copy

Copy

```
3999983
3999976
3999982
3999978
3999977
```

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

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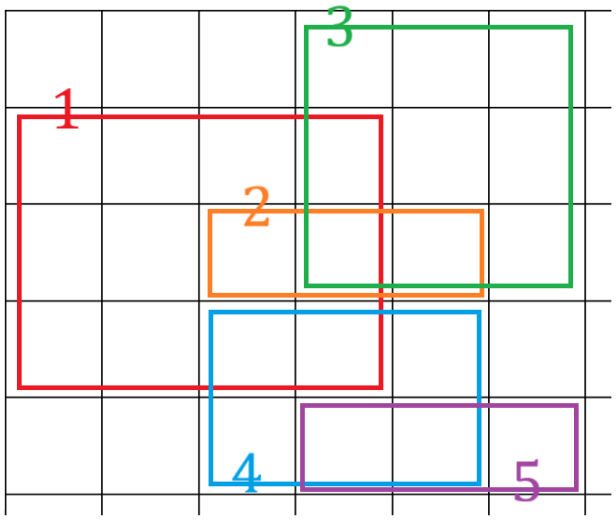

- When cloud 1 is removed, the number of cells covered by some cloud is 17, so the number of cells not covered by any cloud is 3999983.
- When cloud 2 is removed, the number of cells covered by some cloud is 24, so the number of cells not covered by any cloud is 3999976.
- When cloud 3 is removed, the 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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