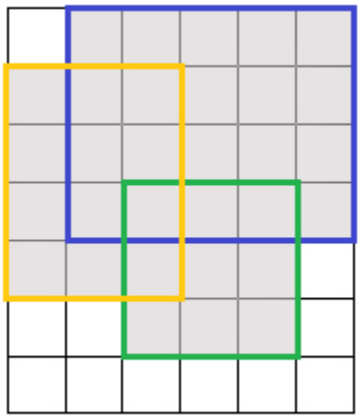
1120 – Rectangle Union

Given some axis parallel rectangles, you have to find the union of their area. For example, see the shaded regions in the picture. Each rectangle will be denoted by four integers. They are $\mathbf{x_1, y_1, x_2, y_2}$ where $\mathbf{(x_1, y_1)}$ denotes the lower left corner and $\mathbf{(x_2, y_2)}$ denotes the upper right corner.



For the picture above, there are three rectangles. For the yellow rectangle the co-ordinates are (0, 2) and (3, 6). For the blue rectangle the co-ordinates are (1, 3) and (6, 7). For the green rectangle the co-ordinates are (2, 1) and (5, 4). So, the union area is (the shaded region) 31 square units.

Input

Input starts with an integer $\mathbf{T (\leq 13)}$, denoting the number of test cases.

Each case starts with a line containing an integer $\mathbf{n\ (1 \leq n \leq 30000)}$. Each of the next **n** lines will contain four integers $\mathbf{x_1, y_1, x_2, y_2\ (0 \leq x_1, y_1, x_2, y_2 \leq 10^9, x_1 < x_2, y_1 < y_2)}$ denoting a rectangle.

Output

For each case, print the case number and the union area.

Sample Input	Output for Sample Input
2 3 0 2 3 6 1 3 6 7 2 1 5 4 2 0 0 4 4 1 1 2 5	Case 1: 31 Case 2: 17

Notes

Dataset is huge, use faster I/O methods.