



The Defensive Walls

Time limit: 8000 ms
Memory limit: 256 MB

In ancient times, there was the Kingdom of Xtreme whose people lived peacefully side by side with a giant race. But at one time, the peace was destroyed because of the inevitable conflict between humans and giants. Humans are very disadvantaged when fighting directly with the giants, so the king could only decide to evacuate his people to a safe place until the peace is reestablished with the giants.

Xtreme Kingdom had a fortress from the past when there was a first war with the giants. Unfortunately, some parts of the fortress were damaged by time so that the people could only use the parts that were still standing strong, because they did not have time to rebuild it again.

You as the king's advisor are asked to calculate the total area of the fortress that can still protect the people from giant attacks. You are given a 2-dimensional map representing fortress' condition. There are N straight line segments representing the walls of the fortress which still stand firm. The walls are built so big and strong that they are guaranteed not to be climbed or destroyed by giants. Each line segment on the map is either vertical or horizontal, i.e. if the endpoints of i-th line segment are (X_{A_i}, Y_{A_i}) and (X_{B_i}, Y_{B_i}) then either $X_{A_i} = X_{B_i}$ or $Y_{A_i} = Y_{B_i}$.

Standard input

The first line of the input contains one integer N representing the number of walls.

The next N lines describe the existing walls. Each line contains four integers separated by single spaces, X_{A_i} , Y_{A_i} , X_{B_i} , and Y_{B_i} indicating that the i-th wall spans between point (X_{A_i}, Y_{A_i}) and point (X_{B_i}, Y_{B_i}) .

Standard output

Output one integer representing total area of the fortress which can protect the people from the giant attacks. An area is safe from giant attacks if it cannot be reached by the giants from outside the fortress.

Constraints and notes

- $1 \leq N \leq 10^5$
- $0 \leq X_{A_i}, Y_{A_i}, X_{B_i}, Y_{B_i} \leq 10^9$
- Either $X_{A_i} = X_{B_i}$ or $Y_{A_i} = Y_{B_i}$
- $X_{A_i} + Y_{A_i} < X_{B_i} + Y_{B_i}$
- The given input is guaranteed that there are no intersections between every parallel line segments.

- For 25% of the test data, $N \leq 100$.
- For 50% of the test data, $N \leq 1\,000$.

Input	Output	Explanation
<pre>16 1 1 10 1 3 0 3 10 2 10 8 10 8 2 8 10 8 2 12 2 11 2 11 5 4 5 11 5 5 5 5 8 5 8 7 8 7 4 7 9 5 4 7 4 6 2 6 7 9 3 10 3 9 4 10 4 10 3 10 4 9 3 9 4</pre>	<pre>16</pre>	<p>Below is the map of the fortress in 2-dimensional coordinates.</p> <p>The overall protected area can be illustrated as two polygons below.</p> <p>So, the total area is $7 + 9 = 16$</p>