

--- Day 5: Hydrothermal Venture ---

You come across a field of **hydrothermal vents** on the ocean floor! These vents constantly produce large, opaque clouds, so it would be best to avoid them if possible.

They tend to form in lines; the submarine helpfully produces a list of nearby lines of vents (your puzzle input) for you to review. For example:

```
0,9 -> 5,9
8,0 -> 0,8
9,4 -> 3,4
2,2 -> 2,1
7,0 -> 7,4
6,4 -> 2,0
0,9 -> 2,9
3,4 -> 1,4
0,0 -> 8,8
5,5 -> 8,2
```

Each line of vents is given as a line segment in the format `x1,y1 -> x2,y2` where `x1,y1` are the coordinates of one end the line segment and `x2,y2` are the coordinates of the other end. These line segments include the points at both ends. In other words:

- An entry like `1,1 -> 1,3` covers points `1,1`, `1,2`, and `1,3`.
- An entry like `9,7 -> 7,7` covers points `9,7`, `8,7`, and `7,7`.

For now, only consider horizontal and vertical lines: lines where either `x1 = x2` or `y1 = y2`.

So, the horizontal and vertical lines from the above list would produce the following diagram:

```
.....1..
..1....1..
..1....1..
.....1..
.112111211
.....
.....
.....
.....
222111....
```

In this diagram, the top left corner is `0,0` and the bottom right corner is `9,9`. Each position is shown as the number of lines which cover that point or `.` if no line covers that point. The top-left pair of `1`s, for example, comes from `2,2 -> 2,1`; the very bottom row is formed by the overlapping lines `0,9 -> 5,9` and `0,9 -> 2,9`.

To avoid the most dangerous areas, you need to determine the number of points where at least two lines overlap. In the above example, this is anywhere in the diagram with a `2` or larger - a total of `5` points.

Consider only horizontal and vertical lines. At how many points do at least two lines overlap?

Your puzzle answer was `7269`.

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Unfortunately, considering only horizontal and vertical lines doesn't give you the full picture; you need to also consider diagonal lines.

Because of the limits of the hydrothermal vent mapping system, the lines in your list will only ever be horizontal, vertical, or a diagonal line at exactly 45 degrees. In other words:

- An entry like `1,1 -> 3,3` covers points `1,1`, `2,2`, and `3,3`.
- An entry like `9,7 -> 7,9` covers points `9,7`, `8,8`, and `7,9`.

Considering all lines from the above example would now produce the following diagram:

```
1.1....11.  
.111...2..  
..2.1.111.  
...1.2.2..  
.112313211  
...1.2....  
..1...1...  
.1.....1..  
1.....1.  
222111....
```

You still need to determine the number of points where at least two lines overlap. In the above example, this is still anywhere in the diagram with a `2` or larger - now a total of `12` points.

Consider all of the lines. At how many points do at least two lines overlap?

Your puzzle answer was `21140`.

Both parts of this puzzle are complete! They provide two gold stars: \*\*

At this point, all that is left is for you to [admire your Advent calendar](#).

If you still want to see it, you can [get your puzzle input](#).

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