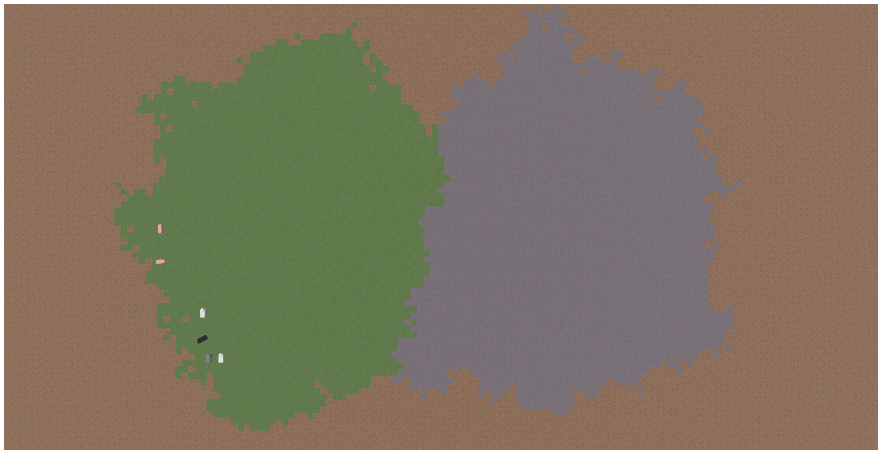
Problem 8: ucb wrote a problem abt grass and shrooms 6+4+2+4 Points

Problem ID: `mycelium`
Rank: `2+3+3+4`

Introduction

Hey Vsauce, Michael here. In Minecraft, grass and mycelium blocks can randomly spread to adjacent dirt blocks over time, creating aesthetic visuals.



But what if they didn't spread randomly? That would be boring. What if they spread at different speeds instead? Wait, who inserted so many stupid links into this problem introduction? I did.

Problem Statement

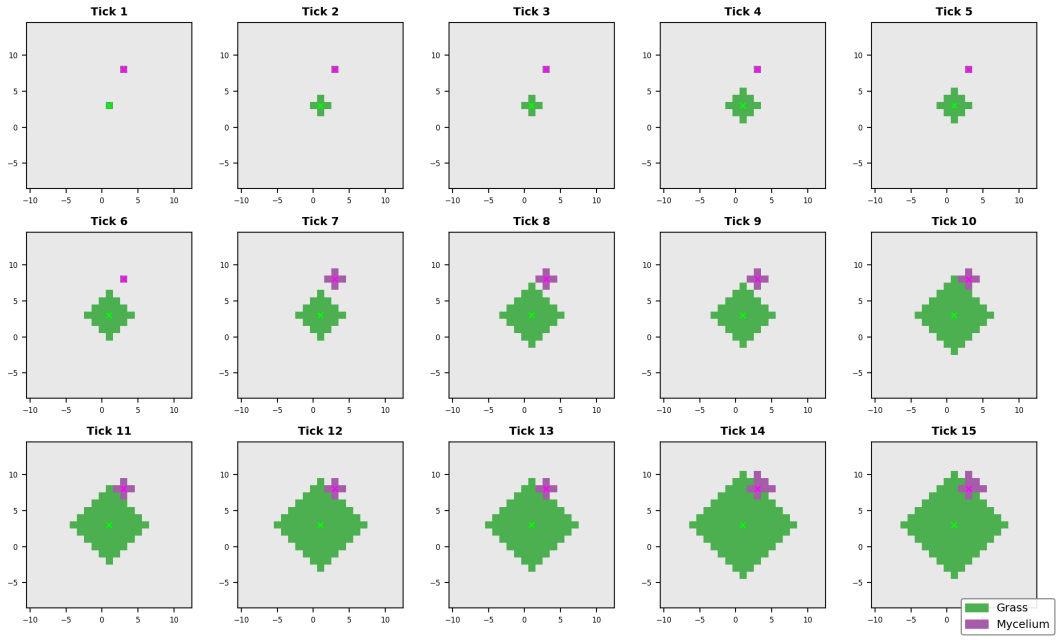
There is an infinite 2D grid with tiles at every pair of integer coordinates. Initially, there is a single grass tile at $(\mathbf{X_G}, \mathbf{Y_G})$ and a single mycelium tile at $(\mathbf{X_M}, \mathbf{Y_M})$, and all other tiles are empty.

Time progresses in discrete ticks:

- Every two ticks (ticks $2, 4, 6, \ldots$), all grass tiles will convert empty tiles directly above, below, left, or right of it into grass tiles.
- Every seven ticks (ticks $7, 14, 21, \ldots$), all mycelium tiles will convert empty tiles directly above, below, left, or right of it into mycelium tiles.
- If both grass and mycelium convert the same tile on the same tick, it converts to grass.

Find the total number of tiles mycelium will ever occupy.

The plot below shows this process. [Here's also an interactive demo showing this process in action.]



Input Format

The first line of the input contains a single integer $\mathbf{T}$ denoting the number of test cases that follow.

Each test case consists of a single line containing four space-separated integers $\mathbf{X_G}$ $\mathbf{Y_G}$ $\mathbf{X_M}$ $\mathbf{Y_M}$ denoting the coordinates of the initial grass tile and the initial mycelium tile, respectively.

Output Format

For each test case, output a single integer denoting the total number of tiles that mycelium will ever occupy.

Constraints

$1 \leq \mathbf{T} \leq 5$
$(\mathbf{X_G}, \mathbf{Y_G}) \neq (\mathbf{X_M}, \mathbf{Y_M})$

Main Test Set

$-10 \leq \mathbf{X_G}, \mathbf{Y_G}, \mathbf{X_M}, \mathbf{Y_M} \leq 10$

Bonus Test Set 1

$-200 \leq \mathbf{X_G}, \mathbf{Y_G}, \mathbf{X_M}, \mathbf{Y_M} \leq 200$

Bonus Test Set 2

$-3 \cdot 10^3 \leq \mathbf{X_G}, \mathbf{Y_G}, \mathbf{X_M}, \mathbf{Y_M} \leq 3 \cdot 10^3$

Bonus Test Set 3

$-4 \cdot 10^8 \leq \mathbf{X_G}, \mathbf{Y_G}, \mathbf{X_M}, \mathbf{Y_M} \leq 4 \cdot 10^8$

Sample Test Cases

Sample Input Download

```
5
0 0 0 1
0 0 -1 -4
1 3 3 8
0 -6 7 0
-10 -10 10 10
```

Sample Output Download

```
2
7
10
37
341
```

Main Sample Explanations

For test case #1, grass starts at $(0, 0)$ and mycelium starts at $(0, 1)$. It can be shown that if you run the process described by the problem statement indefinitely, there will only ever be two mycelium tiles, so the answer is 2. Here's an interactive demo showing this test case in action.

For test case #2, keep in mind that coordinate values may be negative. Here's an interactive demo showing this test case in action.

For test case #3, here's an interactive demo showing this test case in action. The image below also illustrates the first 15 ticks. Observe how grass and mycelium simultaneously convert $(2, 9)$ at tick 14.