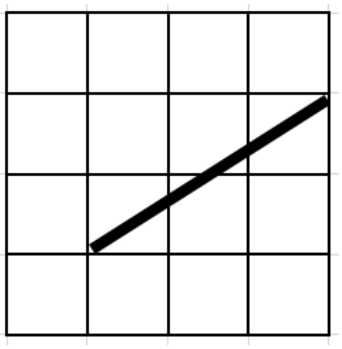
Line Problem

Problem code: LINEPROB

A Sniper is standing at the point (x_1, y_1) on the 2D XY Plane. He shoots from his position towards the point (x_2, y_2). You may assume that all points are integers.

Consider the 2D grid formed by integer points on the XY Plane. The position of the Sniper and the Target are lattice points in this grid. The bullet shot by the Sniper will follow a straight line trajectory from (x_1, y_1) to (x_2, y_2). The bullet goes no further than (x_2, y_2).

Consider the trajectory of the bullet when the Sniper is standing at **(1, 1)** and the Target lies at **(4, 3)**.



Notice how the trajectory of the bullet touches 4 cells. A cell is considered touched by the trajectory **if and only if** the bullet will enter the cell. How many cells are touched by the trajectory of the bullet?

Input

The first line contains a single integer **T**, the number of test cases. Each of the following **T** lines contain one test case each. Each test case contains 4 integers x_1, y_1, x_2 and y_2. The integers are separated by single space characters.

Output

For each test case, output a single line, containing the number of cells touched by the trajectory of the bullet shot from (x_1, y_1) to (x_2, y_2). Remember that a cell is considered touched by the trejectory if and only if the bullet enters the cell - only touching a side is not enough.

Constraints

$0 < T < 10100$
$0 \le x_1, y_1, x_2, y_2 \le 1000000000$

Sample Input

```
3
0 0 3 2
0 0 2 2
0 0 1 0
```

Sample Output

```
4
2
0
```

Explanation

In the second test case, the trajectory of the bullet touches the point **(1, 1)**. The bullet does not enter the cells with bottom left corners at **(0,1)** and **(1,0)**. It directly enters the cell with the bottom left corner at **(1,1)**. Hence, we count only two cells as touched during its trajectory.

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CodeChef was created as a platform to help programmers make it big in the world of algorithms, **computer programming** and **programming contests**. At CodeChef we work hard to revive the geek in you by hosting a **programming contest** at the start of the month and another smaller programming challenge in the middle of the month. We also aim to have training sessions and discussions related to **algorithms, binary search**, technicalities like **array size** and the likes. Apart from providing a platform for **programming competitions**, CodeChef also has various algorithm tutorials and forum discussions to help those who are new to the world of **computer programming**.

Practice Section - A Place to hone your 'Computer Programming Skills'

Try your hand at one of our many practice problems and submit your solution in a language of your choice. Our **programming contest** judge accepts solutions in over 35+ programming languages. Preparing for coding contests were never this much fun! Receive points, and move up through the CodeChef ranks. Use our practice section to better prepare yourself for the multiple **programming challenges** that take place through-out the month on CodeChef.

Compete - Monthly Programming Contests and Cook-offs

Here is where you can show off your **computer programming** skills. Take part in our 10 day long monthly **coding contest** and the shorter format Cook-off **coding contest**. Put yourself up for recognition and win great prizes. Our **programming contests** have prizes worth up to Rs.20,000 and $700lots more CodeChef goodies up for grabs.

Discuss

Are you new to **computer programming**? Do you need help with algorithms? Then be a part of CodeChef's Forums and interact with all our programmers - they love helping out other programmers and sharing their ideas. Have discussions around **binary search, array size, branch-and-bound, Dijkstra's algorithm, Encryption algorithm** and more by visiting the CodeChef Forums and Wiki section.

CodeChef Community

As part of our Educational initiative, we give institutes the opportunity to associate with CodeChef in the form of Campus Chapters. Hosting **online programming competitions** is not the only feature on CodeChef. You can also host a **coding contest** for your institute on CodeChef, organize an **algorithm** event and be a guest author on our blog.

Go For Gold

The Go for Gold Initiative was launched about a year after CodeChef was incepted, to help prepare Indian students for the **ACM ICPC** World Finals competition. In the run up to the **ACM ICPC** competition, the Go for Gold initiative uses CodeChef as a platform to train students for the **ACM ICPC** competition via multiple warm up contests. As an added incentive the Go for Gold initiative is also offering over Rs.8 lacs to the Indian team that beats the 29th position at the **ACM ICPC** world finals. Find out more about the Go for Gold and the **ACM ICPC** competition here.