Problem K. Xiangqi

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	1024 mebibytes

DreamGrid is playing Xiangqi(Chinese Chess) on an infinity 2D plane.

DreamGrid has two black pieces: a horse and a cannon. There is only a red piece - a king - located at the original point $(0, 0)$. DreamGrid wants to eliminate the red king in the minimum steps. To reduce the difficulty, the red king cannot move in the process.

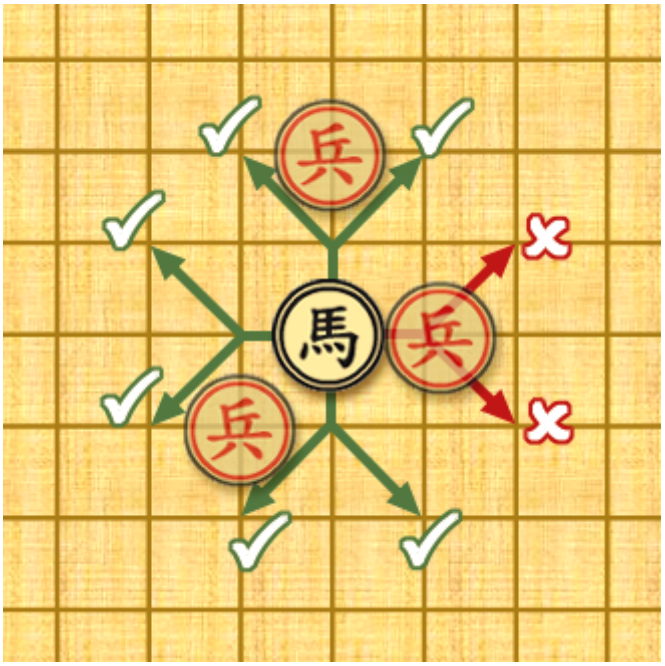
The rules of moving the cannon and the horse is the same as the standard Xiangqi rule, including the 'horse leg' rule. If you don't know that, you can refer to the explanation below.

When you want to move a horse at (x, y), you need to firstly choose two **mutually perpendicular** directions (dx_1, dy_1) and (dx_2, dy_2) which belong to $\{(1, 0), (-1, 0), (0, 1), (0, -1)\}$, and move the horse to $(x + 2dx_1 + dx_2, y + 2dy_1 + dy_2)$. In most cases, the horse can move to eight positions: $(x+2, y+1), (x+2, y-1), (x-2, y+1), (x-2, y-1), (x+1, y+2), (x+1, y-2), (x-1, y+2), (x-1, y-2)$. If there is an opposite piece at the destination of the step, the horse can eliminate it.

The 'horse leg' rule restricts the movement of horses. The horse cannot move to $(x + 2dx_1 + dx_2, y + 2dy_1 + dy_2)$, if there is another piece(either color) at $(x + dx_1, y + dy_1)$.

In a single step, the cannon can either move or attack. It can move any distance horizontally or vertically(select one of them) in a step, but it cannot jump over other pieces when moving. Cannon can only attack other pieces with a 'cannon platform'. Formally, in a direction(up, down, left, right) of the cannon, if there are two or more pieces, and the **second** nearest piece is opposite, the cannon can eliminate the piece and move there.

Attack of cannon



Movement of horse

Can you help DreamGrid eliminate the red king in the minimum steps?

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \le T \le 500\,000$), indicating the number of test cases. For each test case:

The only line contains four integers x_h, y_h, x_c, y_c ($-10^9 \le x_h, y_h, x_c, y_c \le 10^9$). The initial position of the horse is (x_h, y_h), and the initial position of the cannon is (x_c, y_c).

It's guaranteed that the initial positions of the horse, the cannon, and the king are distinct.

Output

For each test case output one line, indicating the minimum step to eliminate the red king.

Example

standard input	standard output
5 -2 1 5 5 5 0 6 0 2 1 1 1 100 2 -1 0 4 2 1 1	1 1 2 5 3