III Akademickie Mistrzostwa Polski w Programowaniu Zespołowym

ALLTEL   Andersen Consulting   Microsoft   Novell

PROBLEM A

Ball

On the rectangular chessboard of $n \times m$ square fields we choose one field adjacent to the edge of the chessboard, called *starting field*. Then we put a ball in the center of this field and push it to roll through the chessboard. The diameter of the ball equals the width (and height) of chessboard field. The angle between the direction of ball movement and the edge of the chessboard equals 45°. The ball bounces off the edges of the chessboard: if the ball touches the edge of the chessboard then each composite of its velocity perpendicular to the edge touched is reversed. At the start the ball is pushed toward increasing coordinates (when the starting field is a field of the highest coordinate, the ball bounces momentarily).

We assign a point to a field of the chessboard each time the point of adjacency between the ball and the chessboard enters the interior of the field. The game is over when a point is assigned to the starting field. What is the number of fields to which an odd number of points is assigned? The following figures illustrate the problem. The route of the ball is marked with a dashed line. Fields with the odd number of points are shadowed.
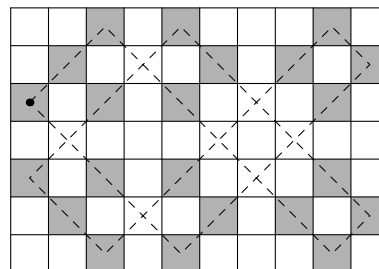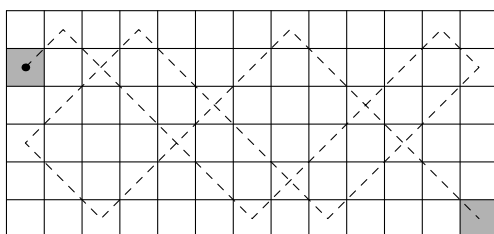
Task

Write a program which for each data set from a sequence of several data sets:

- reads the dimensions of the chessboard and the coordinates of starting field from the text file `A.IN`,
- computes the number of fields with the odd number of points,
- writes the result to the text file `A.OUT`.

Input

The first line of the input file `A.IN` contains one integer d, $1 \le d \le 10$, which is the number of data sets. The data sets follow. Each data set occupies one line of the input file. Such a line consists of four integers x, y, a, b separated with single spaces. These integers are, x- and y-dimensions of the chessboard and x- and y-coordinates of the starting field, respectively. Integers x and y are greater than two, the number of fields of the chessboard does not exceed 10^9, the starting field is adjacent to the edge of the chessboard.

Output

The i-th line of the output file `A.OUT` should contain one integer which is equal to the number of fields of the chessboard with the odd number of points.

Example

For the input file `A.IN`:
2
13 6 1 5
10 7 1 5
the correct answer is:
2
22