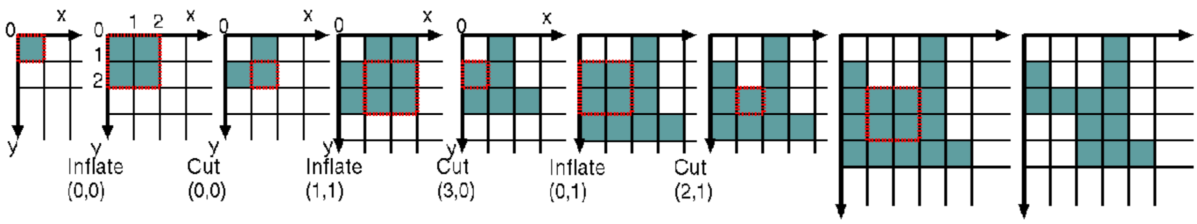
919 Cutting Polyominoes

A polyomino may be viewed as a set of squares connected by their sides. Its boundary is an orthogonal polygon. They are often classified by their number of squares, which is equal to their area if each square has area 1. We may represent a polymino in a grid as shown below. We are interested in polyominoes without holes and that have exactly one edge in each grid line that intersects them. Did you know that each polyomino results from a square (of area 1) by applying pairs of transformations **INFLATE/CUT**? For example, the polyomino shown on the right is obtained if one applies **INFLATE** (0,0), **CUT** (0,0), **INFLATE** (1,1), **CUT** (3,0), **INFLATE** (0,1), **CUT** (2,1), **INFLATE** (1,2), **CUT** (0,5). It easy to see that it has area 12.



We are considering that the initial northwest corner is placed in (0,0) and that x and y grow as in the figure. **INFLATE** (p_i, q_i) means "multiplying by 4 the area of the cell" (i.e. square) whose northwest corner is in (p_i, q_i). For this, we must duplicate the grid line where this cell is located and then duplicate the column where the cell was located. Obviously, we can drag down cells and then drag other cells to the right. The coordinates of the polyomino are also modified: $x- > x+1$ iff $x > p_i$ and $y- > y+1$ iff $y > q_i$. **One cell can only be inflated if it belongs to the polyomino**.

The sequence "**INFLATE** (p_i, q_i) **CUT** $((x_i, y_i)$" means that one must cut the rectangle defined by the points (p_i+1, q_i+1),(p_i+1, y_i), (x_i, y_i),(x_i, q_i+1). **Such rectangle can only be cut if it simultaneously satisfies the following conditions**:

(A) it is actually a rectangle and it is part of the polyomino;

(B) (x_i, y_i) is a vertex of the inflated polyomino and none of the other vertices of the inflated polyomino belongs to the rectangle (either to its interior or boundary);

(C) at least one of the points (x_i, q_i+1) and (p_i+1, y_i) is in an edge that contains (x_{ii}).

Your task is to write a program that computes the area of polyominoes that result from applying a sequence of transformations **INFLATE-CUT** to squares of area 1.

Input

The input is a sequence of descriptions of polyominoes's constructions, ended by '0'. Each description starts with an integer $r \leq 50$, which is the number of pairs **INFLATE-CUT**, followed by r rows, each one with four integers p_i, q_i, x_i, y_i, that mean "**INFLATE** (p_i, q_i) **CUT** (x_i, y_i)". Observe that the polyomino resulting from r **INFLATE-CUT**'s has $2r+4$ vertices.

Output

Each line of the output will have the area of the constructed polyomino or '0' if any step in the construction does not satisfy the rules just defined.

Sample Input

```
4
0 0 0 0
1 1 3 0
0 1 2 1
1 2 0 5
6
0 0 0 0
1 1 3 0
0 1 2 1
1 2 0 5
5 5 5 4
3 4 2 2
6
0 0 0 0
1 1 3 0
0 1 2 1
1 2 0 5
4 4 2 3
5 5 5 5
5
0 0 2 2
1 0 1 2
2 1 4 0
0 3 0 0
1 2 3 1
2
0 0 0 1
0 0 2 2
0
```

Sample Output

```
12
0
0
18
0
```