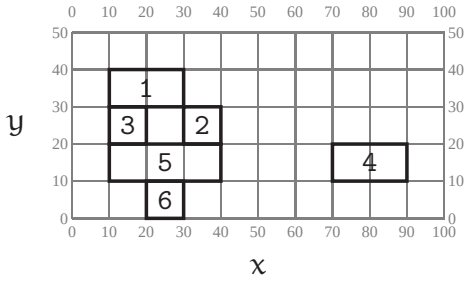
Tumble Down

Computer Science Society
Programming Contest
Fall 2008

Imagine a collection of two-dimensional rectangular blocks whose sides are perfectly horizontal or vertical, pushed downward (in the negative y-direction) by gravity. Blocks resting on the x-axis or firmly atop another block are well-supported, and resist tumbling downward. In this problem, we are given the positions of a collection of blocks and determine which blocks are supported and which are not supported. In the following example, blocks 2, 3, 5 and 6 are supported, block 4 is not supported, and block 1 is not supported (but would be if moved slightly left or right).



Let a and b be blocks. We define $\text{top}(b)$ and $\text{bottom}(b)$ to be the y-coordinates of the bottom edge and top edge of b, and define $\text{left}(b)$, $\text{center}(b)$ and $\text{right}(b)$ to be the x-coordinates of the left edge, vertical center and right edge of b. We define

a *left-supports* b if $\text{bottom}(b) = \text{top}(a)$ and $\text{left}(b) < \text{right}(a)$ and $\text{center}(b) > \text{left}(a)$.
a *right-supports* b if $\text{bottom}(b) = \text{top}(a)$ and $\text{right}(b) > \text{left}(a)$ and $\text{center}(b) < \text{right}(a)$.
b is *supported* if $\text{bottom}(b) = 0$ or
$\exists a_l, a_r$ [a_l is supported and a_r is supported and
a_l left-supports b and a_r right-supports b].

Input Format

Each line of input describes a block b and contains non-negative integers x, y and positive integers w, h separated by white space. (x, y) is the coordinate of the bottom left corner, w is the width, and h is the height of block b. Blocks on successive lines are implicitly numbered $1, 2, 3, \ldots$ You may assume that no two blocks in the input overlap.

Output Format

For each block described in the input, output a line giving the block number and indicating whether or not it is supported, as shown in the output sample.

Input Sample

```
10 30 20 10
30 20 10 10
10 20 10 10
70 10 20 10
10 10 30 10
20 0 10 10
```

Output Sample

```
block 1 is not supported
block 2 is supported
block 3 is supported
block 4 is not supported
block 5 is supported
block 6 is supported
```