
Tic-tac-toe

X39419_en

A Tic-tac-toe board can be represented by a binary matrix where the ones and zeros represent the \times and \circ marks, respectively. The following board represents a possible final configuration after playing the game.

1	0	1
1	1	0
0	0	1

We can represent the board with a 9-bit vector, with the indices of the vector representing the board locations as follows:

8	7	6
5	4	3
2	1	0

Thus, the previous board would be represented with the bit-vector 101110001. Note that a board may contain more than one row of ones and more than one row of zeros.

Design a circuit that receives a board description and generates two outputs. One output will be activated when there is at least one row of ones (vertical, horizontal or diagonal). The other output will be activated when there is at least one row of zeros.

Specification

```
module tictactoe(board, row1, row0);  
    input [8:0] board;  
    output row0, row1;
```

Hint

Try to minimize the effort by reusing the design of some module in the same circuit.

Input

- *board* is a 9-bit vector describing a Tic-tac-toe board.

Output

- *row1* is the output indicating whether there is a row of ones.
- *row0* is the output indicating whether there is a row of zeros.

Problem information

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