NCTU-EE DCS – 2017

Lab03 Exercise

Design: Tic-Tac-Toe

Data Preparation

1. Extract test data from TA's directory:

   % tar xvf ~dcsta02/LAB03.tar

2. The extracted LAB directory contains:

   a. EXERCISE/ : Exercise

Design Description

In this lab, you are going to play Tic-Tac-Toe. You are going to receive two inputs, first input indicates initial position, second input defines state (O or X) of sequence sheet.

After that, you can compute bingo line. Finally, you should give O bingo line number and X bingo line number.

1	2	3
4	5	6
7	8	9

Ex :

Initial position is 6

initial position

State of sequence sheet is XOOOXXOXO

Corresponding position : XOOOXXOXO <=> (5,4,3,2,1,9,8,7,6)

X	O	O
O	X	O
X	O	X

O bingo line number is 0

X bingo line number is 1

Inputs

The signal ORIGIN is *unsigned 4 bits* input, which indicates initial position (it's range is 1~9). The signal SEQUENCE is *unsigned 9 bits* input and define state of sequence sheet "O" or "X" (0 indicates "O", 1 indicates "X").

Outputs

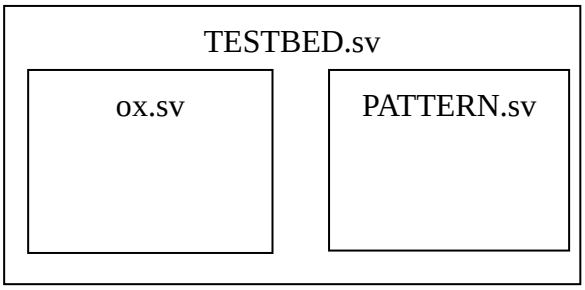
The signal Line_O is *unsigned 4 bits* input, outputs "O" bingo line number.

The signal Line_X is *unsigned 4 bits* input, outputs "X" bingo line number.

Specifications

1. Top module name : ox (File name: ox.v)
2. Input pins: Original_pos[3:0], Sequence[8:0].
3. Output pins: Line_O[3:0], Line_X[3:0].
4. **We will get back your code and do code checking with computer tool (No** plagiarism**)**

Block Diagram



Grading Policy

1. Pass the RTL simulation
2. Synthesis successful (no error and latch)

Note

Template folders and reference commands:

1. 01_RTL/ (RTL simulation) **./01_run**
2. 02_SYN/ (Synthesis) **./01_run_dc**

Sample Waveform