User Manual

The game board is a 6x7 LED grid located at [0:5][15:9] (top left) on the 16x16 LED matrix.

SW[9:3] will be used to select the column for each turn, with SW[9] corresponding to column 15 (1) and SW[3] corresponding to column 9 (7).

KEY[0] will be used as the reset for all of the sequential logic, resetting the game.

At reset, all LEDs on the game board should be turned off until the first move. The game will always begin with Player 1's turn at reset.

LED[0] will be used to indicate when the board is awaiting a valid move, so it will be on unless a turn is in progress (the token drop animation is in progress or the selected switch has not been returned to the off position).

The switch that was turned on for the column selection must be turned back off before the game can proceed to the next turn.

An invalid move would be if the player attempts to use SW[2:0] to select a column or if they select a column that is full.

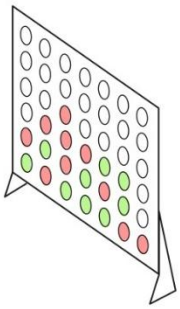
HEX[5:0] will display the current player and the winner at the end of the game.

If it is Player 1's turn, the HEX display will be [P][1][ ][ ][ ][ ]. For Player 2's turn, [P][2][ ][ ][ ][ ]. If Player 1 wins, [P][1][P][1][P][1]. If Player 2 wins, [P][2][P][2][P][2]. If the result is a draw (the board is filled without any 4-in-a-rows achieved), [ ][ ][ ][ ][ ][ ].

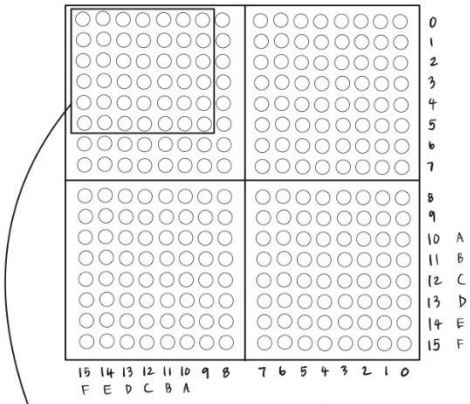
See next page for visual guide.

GAME DESIGN

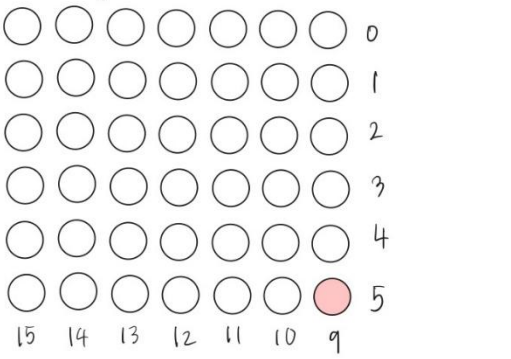
DE1-SoC I/Os

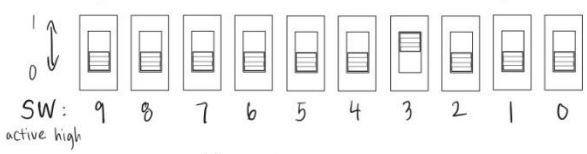


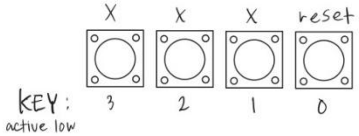
16 x 16 LED extension board

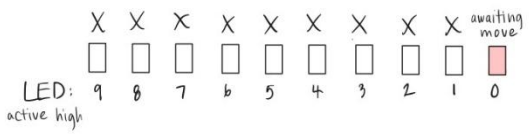


6 x 7 game board:



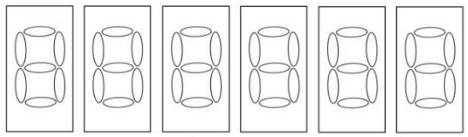




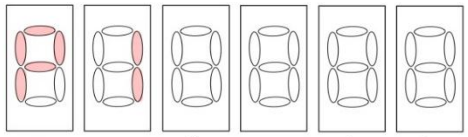


HEX configurations:

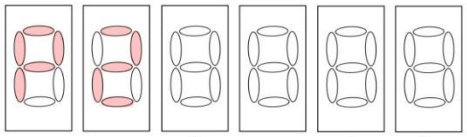
blank (draw):



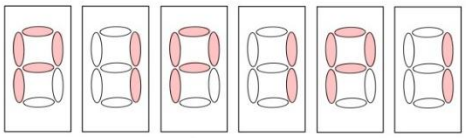
Player 1 turn:



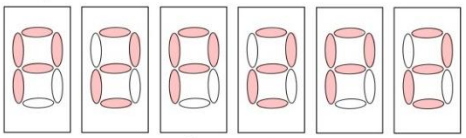
Player 2 turn:



Player 1 win:



Player 2 win:



Block Diagram