Lab 6 – Quadrature Encoder Decoding

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March 7, 2021

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Code:

```
/*
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        Purpose: With the use of a quadrature encoder, this code will count up
        on the LED display when turning clockwise, and count down when turning
        counter-clockwise.
*/

module qdecoder
  ( input logic a, b,
    input logic clock,
    output logic up, down ) ;

// my code is here
       logic [3:0] state;

        always_ff@(posedge clock) state[0] = a;

        always_ff@(posedge clock) state[1] = b;

        always_ff@(posedge clock) state[2] = state[0];

        always_ff@(posedge clock) state[3] = state[1];


        assign down =
            state == 4'b1101 ||
            state == 4'b0100 ||
            state == 4'b0010 ||
            state == 4'b1011 ? 1 :
            0;

        assign up =
            state == 4'b1110 ||
            state == 4'b1000 ||
            state == 4'b0001 ||
            state == 4'b0111 ? 1 :
            0;



endmodule
```
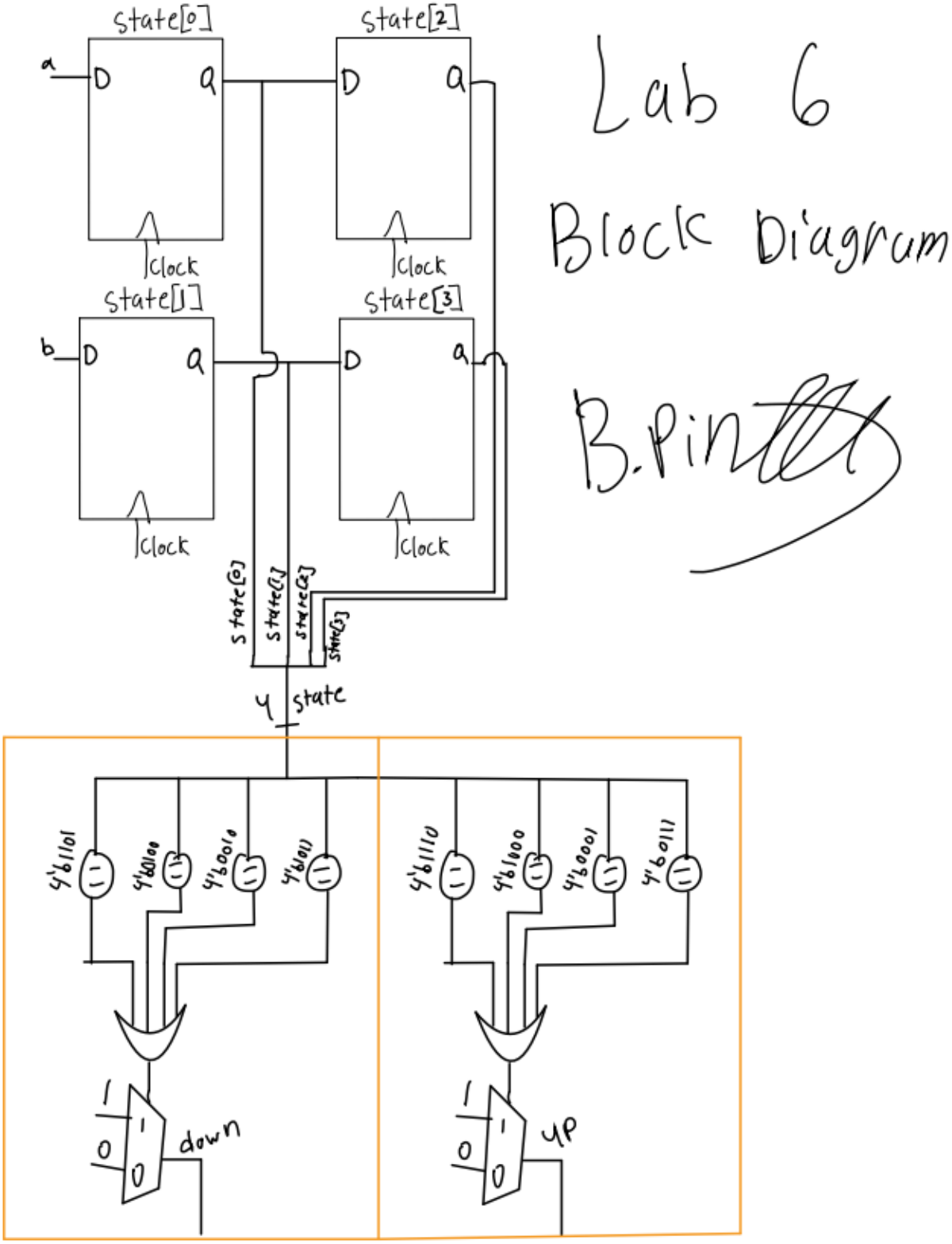
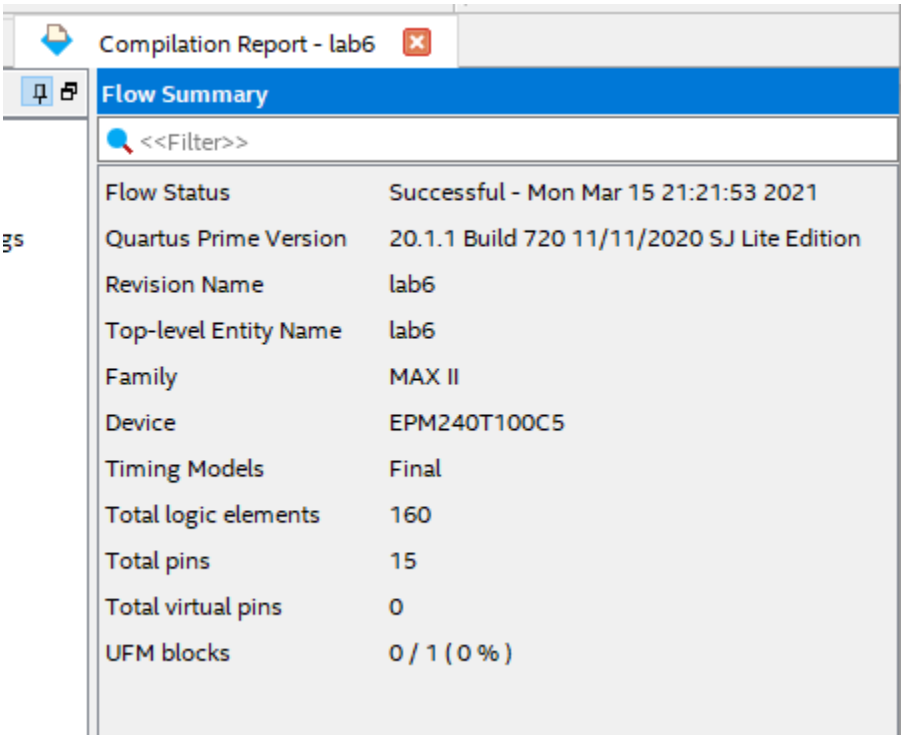
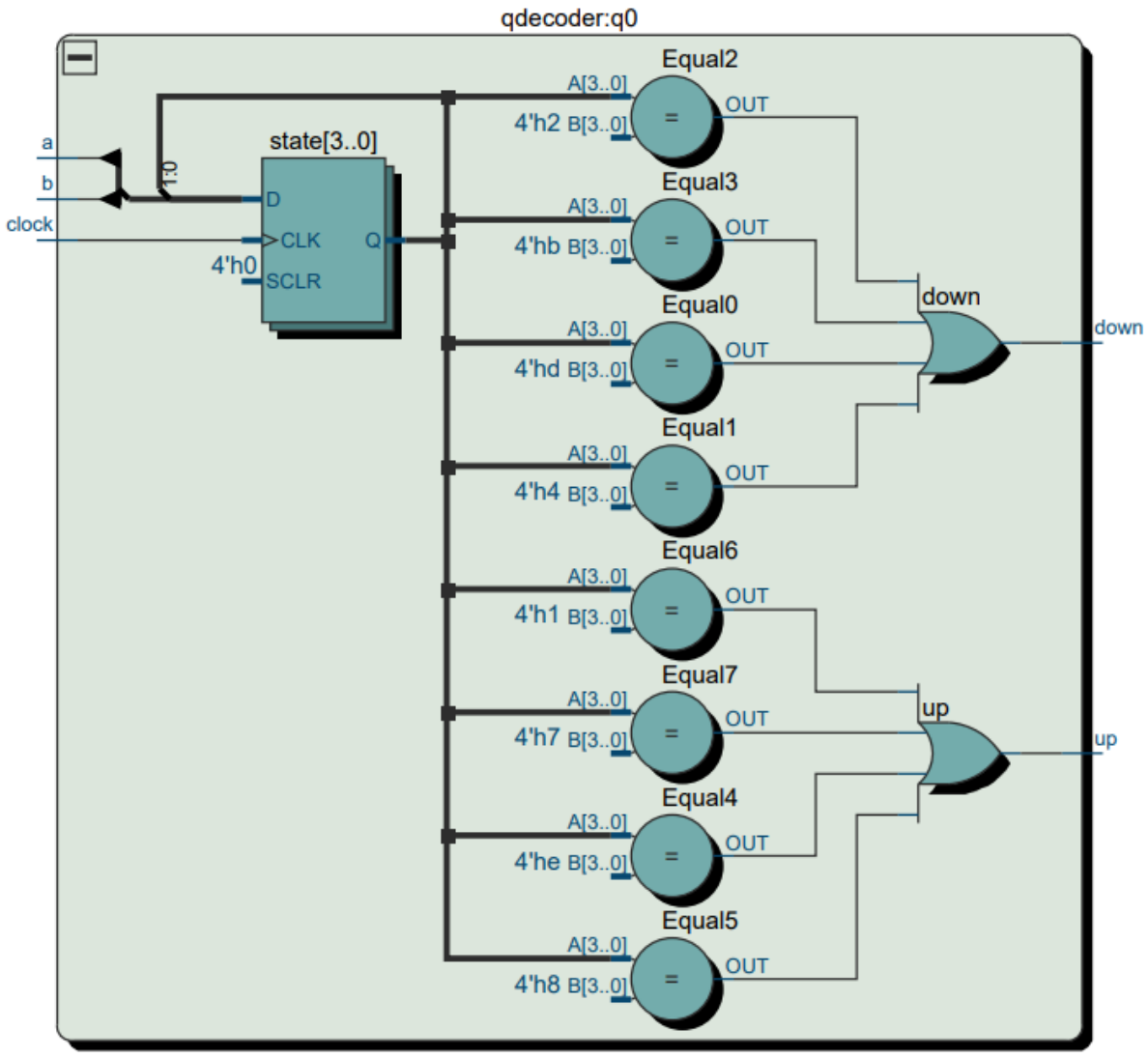

Block Diagram:



Compilation Report:



RTL Viewer:


qdecoder:q0
a
b
clock
1:0
state[3..0]
D
CLK
Q
4'h0
SCLR
Equal2
A[3..0]
4'h2 B[3..0]
=
OUT
Equal3
4'hb
Equal0
4'hd
Equal1
4'h4
Equal6
4'h1
Equal7
4'h7
Equal4
4'he
Equal5
4'h8
down
up