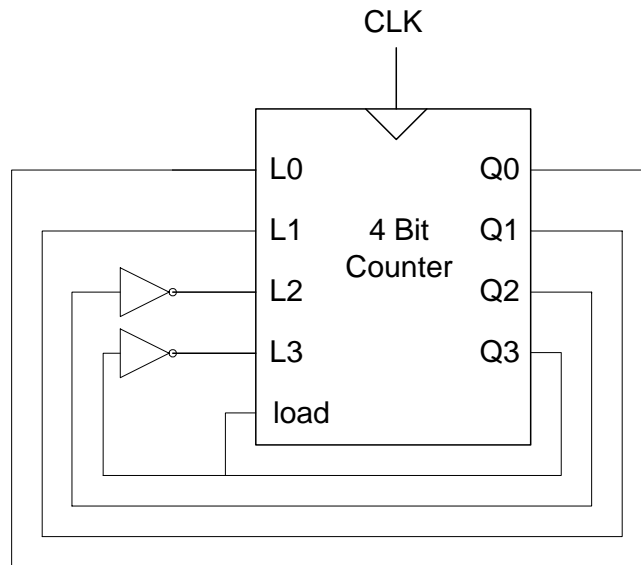


## EECS 270

### Homework #10

1. What is the counting sequence of the following counter? **(5)**



2. page 788, #8.29 **(5)** *Hint: Design a 4-bit ripple counter that counts up first*
3. page 789, #8.36 **(5)**
4. **Bonus:** Consider the following process of building one n-input/1-output FSM, MX, from two such machines M1 and M2. Take the product of M1 and M2, then XOR their outputs. Pair up inputs of M1 and M2 (each of n pairs will have one input from M1 and one input from M2), and fanout each of the n inputs of MX to some pair.

Suppose it turned out that for some matching of input pins and pairs the MX machine *always* produces 0 on the output, regardless of its state and its inputs. What can we say about M1 and M2 if neither of them has this property? **(+ 3 extra credit)**

Generalize the construction and conclusion to m-output machines.  
**(+ 2 extra credit)**