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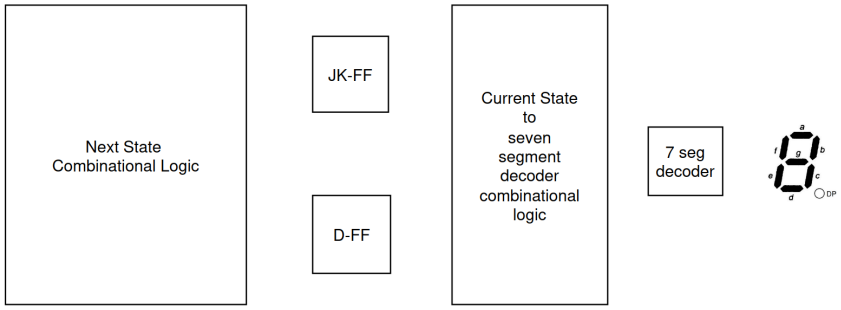
HW4: Flip Flops & Counters

1. Draw the NSTT for a J-K Flip Flop, Toggle Flip Flop, D Flip Flop and S-R Latch

2. Design a counter with the sequence 3, 7, 0, 1. Use a D Flip Flop for the 0th bit, and J-K Flip Flop for the 1st bit. Use variables Y3, Y2, Y1, and Y0 to represent the value sent to the seven segment decoder.



3. Design a counter that is controlled by a singular asynchronous input X. Use J-K Flip-flops for all current state bits.
   X = 0 -> Sequence is .. 01, 10, 11, 00
   X = 1 -> Sequence is .. 00, 11, 10, 01

4. Design a counter that is controlled by TWO asynchronous inputs X1, and X0. Use T Flip flops for all Q bits
   X1 = 0, X0 = 0 -> Sequence is .. 00, 01, 11, 10
   X1 = 0, X0 = 1 -> Sequence is .. 10, 11, 01, 00
   X1 = 1, X0 = 0 -> Sequence is .. 11, 10, 00, 01
   X1 = 1, X0 = 1 -> Sequence is .. 01, 00, 10, 11

5. Complete the Timing Diagram for the Q_1 and Q_0 where a J-K Flip Flop is used for Q_1 and a T Flip Flop is used for Q_0. Assume that Clear_L starts the count at 00.