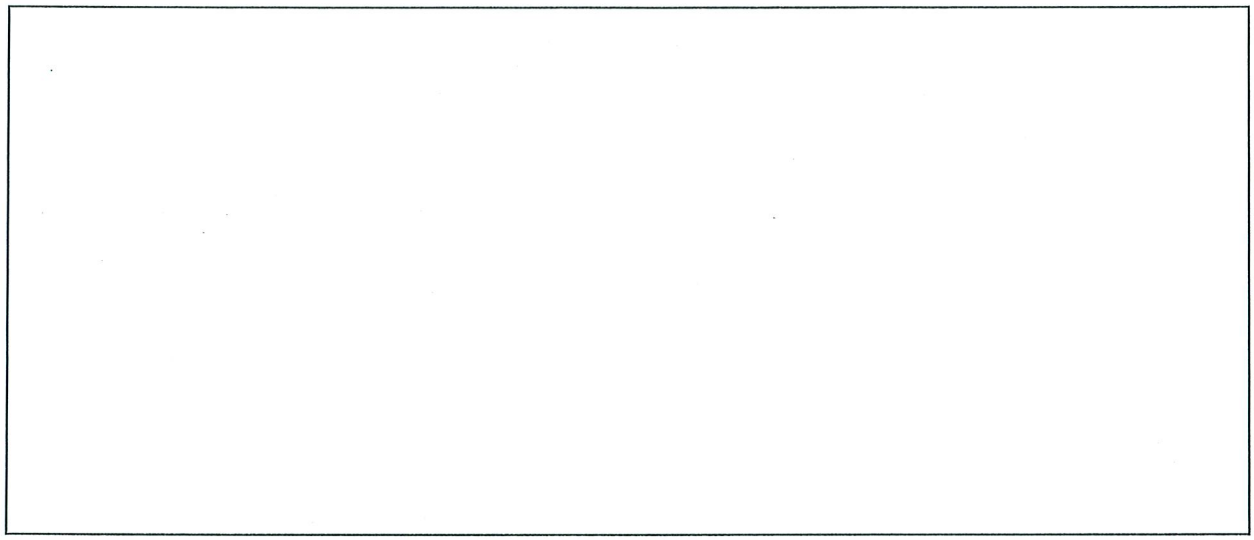
Revisited Concept Exercise for Module 3 – No. 1
Monday, March 10, 2014

1. Draw the circuit for a bi-stable using N- and P-Channel MOSFETs (HINT – consists of two inverters):



2. Define metastability:

_____

_____

3. Fill in the ***present state – next state*** table for an S-R latch (Q* is the **next state**):

S	R	Q	Q*
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Q* = _____

Revisited Concept Exercise for Module 3 – No. 2
Wednesday, March 12, 2014

1. Draw the circuit for a bistable using N- and P-channel MOSFETs.

2. Fill in the PS-NS table for a "D" flip-flop and derive its next state equation.

D	Q	Q*
0	0	
0	1	
1	0	
1	1	

Q* = _____

3. Fill in the PS-NS table for a "T" flip-flop and derive its next state equation.

T	Q	Q*
0	0	
0	1	
1	0	
1	1	

Q* = _____

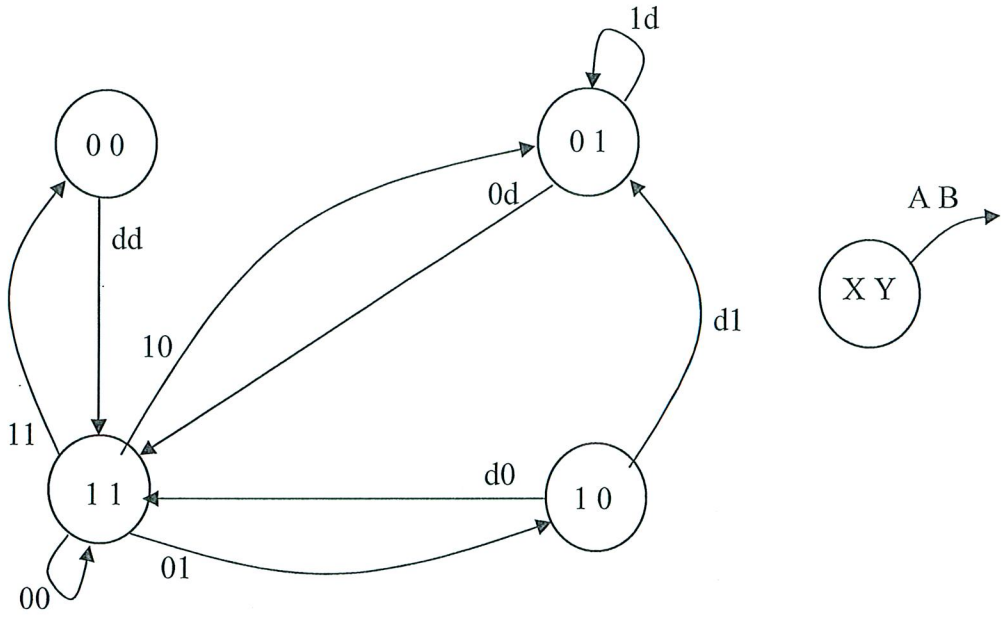
4. Fill in the PS-NS table for an "S-R" flip-flop and derive its next state equation.

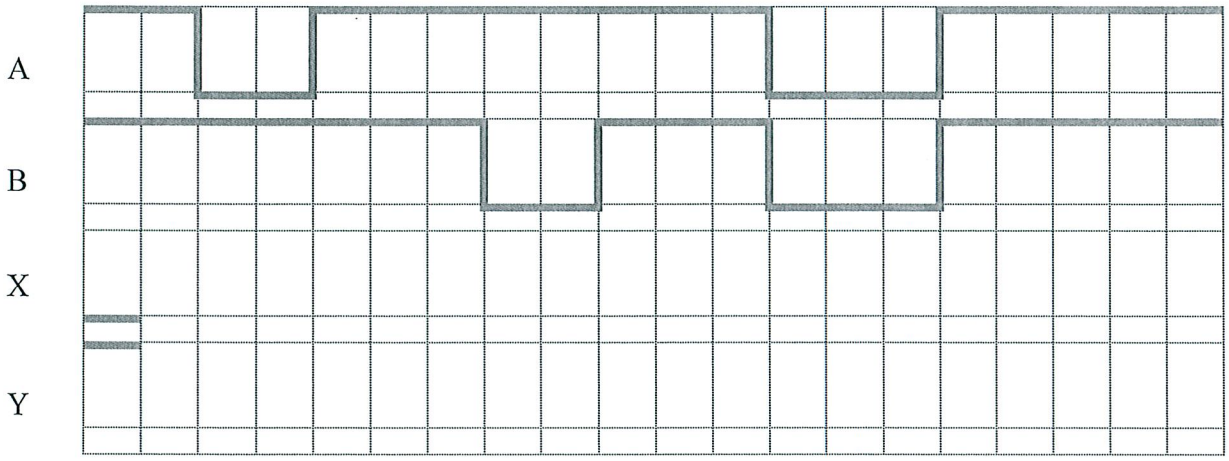
S	R	Q	Q*
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	

Q* = _____

Revisited Concept Exercise for Module 3 – No. 3
Monday, March 24, 2014

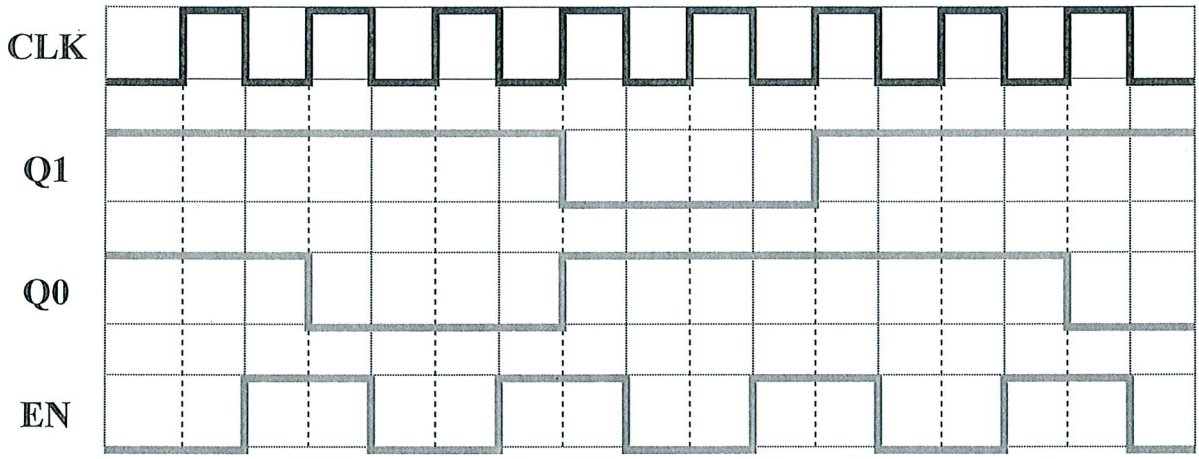
Given the following state transition diagram, complete the timing chart below.

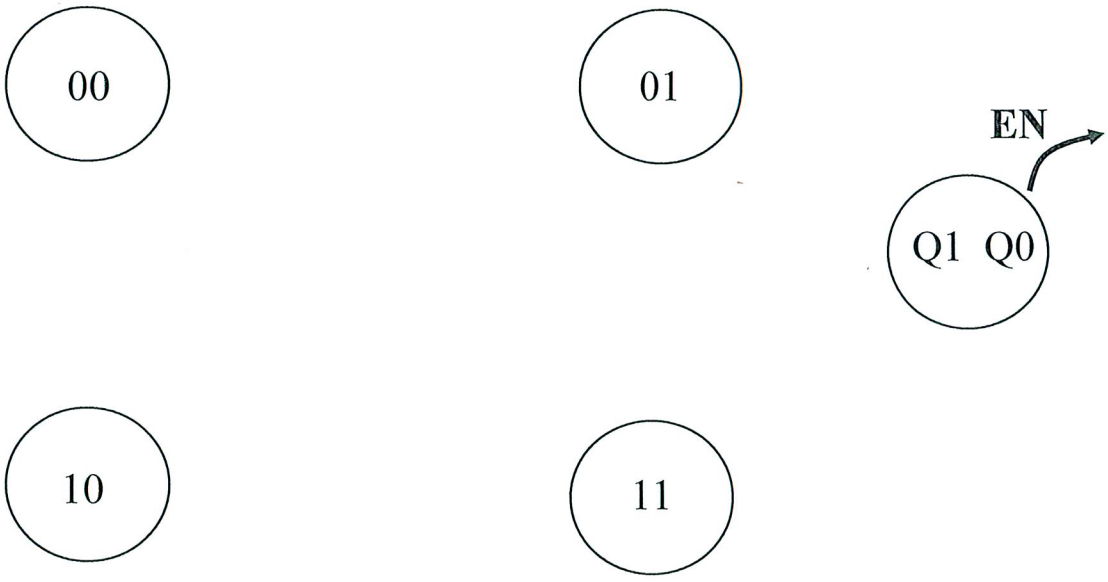




Revisited Concept Exercise for Module 3 – No. 4
Wednesday, March 26, 2014

Given the timing diagram, below, for a state machine that has one input (EN) and two state variables (Q1 and Q0), derive a state transition diagram (note that there is *one unused state*).





Revisited Concept Exercise for Module 3 – No. 5
Monday, March 31, 2014

Using a 7-segment display, design a "direction run indicator" (similar to that used on VCRs) that sequences the perimeter segments in a *clockwise* fashion if mode control input M=1 (A→B→C→D→E→F→A→B…), or in a *counter-clockwise* fashion if mode control input M=0. Input S should control whether the display is running (S=0) or stopped (S=1); if stopped, the middle segment (G) should be on and the rest should be off. Draw a *Moore* model state transition diagram.