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Course: CMSC 2833 – Computer Organization I
Assignment: a05
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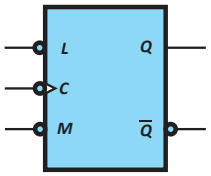
Scoring block			
Exercise	**Maximum**	**Earned**	**Explanation**
1	3	3	
2	3	3	
3	3	3	
4	3	3	
5	3	3	
Total	**15**	**15**	

1. Using the steps discussed in Lecture 61, Flip-Flop Design:
   (a) Design a NAND cell centered LM Flip-Flop specified by the following characteristic table and schematic symbol.

L	*M*	*Q(t)*	*Q(t+1)*
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	0

LM Flip-Flop Characteristic Table



LM Flip-Flop Schematic Symbol

Solution:

   (b) Define the excitation table for the LM Flip-Flop.
Solution:

2. A Null-Lobur Flip-Flop (NL Flip-Flop) behaves as follows: If $N = 0$, the Flip-Flop does not change state. If $N = 1$, the next state of the Flip-Flop is equal to the value of L.
   (a) Derive the characteristic table for the NL Flip-Flop.
Solution:

   (b) Show how an SR Flip-Flop can be converted to an NL Flip-Flop.
Solution:

3. Using the steps discussed in Lecture 62, Flip-Flop Conversion, convert a D-Latch to a JK Flip-Flop.
Solution:

4. Using the steps discussed in Lecture 62, Flip-Flop Conversion, convert a RS to a LM Flip-Flop.
Solution:

5. Using the steps discussed in Lecture 62, Flip-Flop Conversion, convert a JK Flip-Flop to a D-Latch Flip-Flop.
Solution: