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ENGR 378.04

Pre-lab 3

1.

G	D	Q	Q^+
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Output depends on the enable signal G and input signal D. When the latch is not enabled (i.e. G=0), the output is in retention state (i.e. keeps its previous output). When G=1, output follows the input signal D.

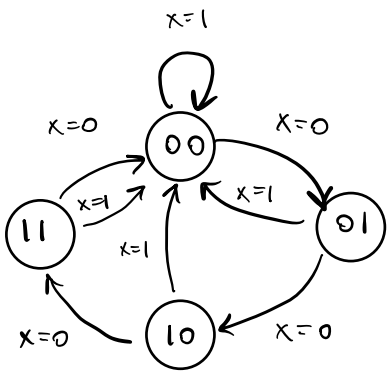
J	K	Q	Q^+
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	0

The FF is triggered by the falling edge of the clock. J acts as 'set' & K acts as 'reset'. When both J & K are zero, FF does not change its state. When both J & K are one, the output is toggled.

2.

Present state	Next state X=0	Next state X=1	J_A X=0	J_A X=1	K_A X=0	K_A X=1	J_B X=0	J_B X=1	K_B X=0	K_B X=1
00	01	00	0	0	0	0	1	0	0	0
			0	0	1	1	1	0	1	1
01	10	00	1	0	0	0	0	0	1	1
			1	0	1	1	1	1	1	1
10	11	00	0	0	0	1	1	0	0	0
			1	1	0	1	1	0	1	1
11	00	00	0	0	1	1	0	0	1	1
			1	1	1	1	1	1	1	1

Present state	Next state X=0	Next state X=1	J_A X=0	J_A X=1	K_A X=0	K_A X=1	J_B X=0	J_B X=1	K_B X=0	K_B X=1
00	01	00	0	0	X	X	1	0	X	X
01	10	00	1	0	X	X	X	X	1	1
10	11	00	X	X	0	1	1	0	X	X
11	00	00	X	X	1	1	X	X	1	1



X \ Q_AQ_B	00	01	11	10
0	0	1	X	X
1	0	0	X	X

$J_A = Q_B x'$

X \ Q_AQ_B	00	01	11	10
0	X	X	1	0
1	X	X	1	1

$K_A = Q_B + x$

X \ Q_AQ_B	00	01	11	10
0	1	X	X	1
1	0	X	X	0

$J_B = x'$

X \ Q_AQ_B	00	01	11	10
0	X	1	1	X
1	X	1	1	X

$K_B = Q_B$