

ECE M16 Homework 2

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July 12, 2022

HW1 Problem 4 part b

A handwritten truth table for a 2-input function. The inputs are labeled p and q . The outputs are labeled 0 and 1. The table is a 2x4 grid with the following values:

$p \backslash q$	00	01	11	10
0	0	1	1	0
1	0	0	1	1

HW1 Problem 7

(a)

Month	m3	m2	m1	m0	output
1	0	0	0	1	1
2	0	0	1	0	0
3	0	0	1	1	1
4	0	1	0	0	0
5	0	1	0	1	1
6	0	1	1	0	0
7	0	1	1	1	1
8	1	0	0	0	1
9	1	0	0	1	0
10	1	0	1	0	1
11	1	0	1	1	0
12	1	1	0	0	1

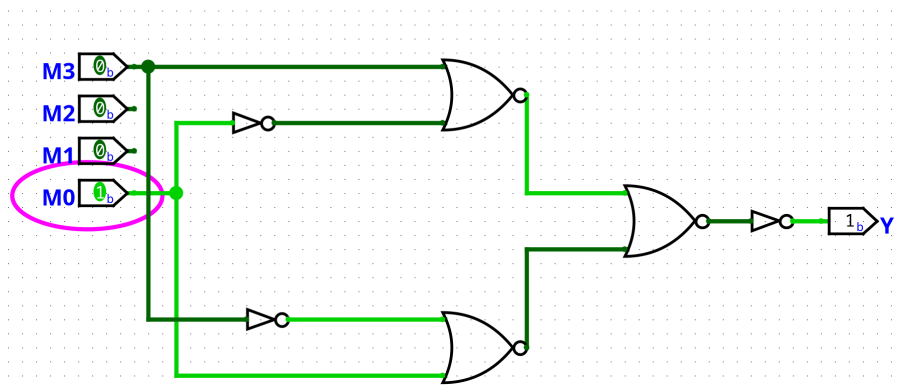
(b)

m \ n	00	01	10	11
0	1	0	1	0
1	1	1	0	0
2	1	1	0	1
3	0	0	1	0

Therefore the equation is:

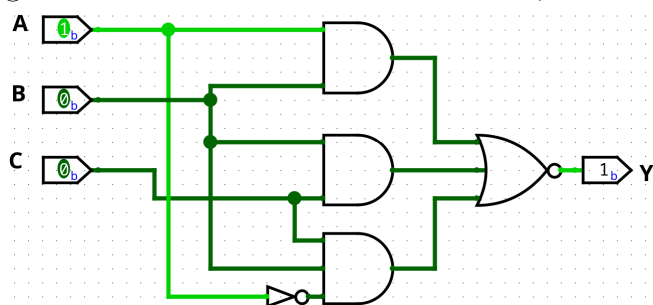
$$m_0 \cdot \overline{m_3} + \overline{m_0} \cdot m_3$$

(c)



HW 2 Problem 1

There would be a static 0 hazard between $b = 1, c = 1, a = 0$ and $b = 1, c = 1, a = 1$. We can fix it with the following circuit. We can fix this by adding an And gate between b and c before the nor, so the resulting function would look like this



Problem 2

Let the inputs be $M[0 : 3]$ then we have the following truth table

decimal	M3	M2	M1	M0	q2	q5
0	0	0	0	0	1	1
1	0	0	0	1	0	1
2	0	0	1	0	1	1
3	0	0	1	1	0	1
4	0	1	0	0	0	1
5	0	1	0	1	0	0
6	0	1	1	0	1	0
7	0	1	1	1	0	1
8	1	0	0	0	1	1
9	1	0	0	1	0	1

Therefore we will have the following Kmap for q2

		q^2 $M1, M0$			
		00	01	11	10
$M3, M2$	00	1	0	0	1
	01	0	0	0	1
	11	-	-	-	-
	10	1	0	-	-

Therefore the equation for q2 is:

$$q2 = \overline{M2} \cdot \overline{M0} + M1 \cdot \overline{M0}$$

Likewise, the Kmap for q5 is

		q^5 $M1, M0$			
		00	01	11	10
$M3, M2$	00	1	1	1	1
	01	1	0	1	0
	11	-	-	-	-
	10	1	1	-	-

Therefore the equation for q5 is:

$$q5 = \overline{M2} + \overline{M1} \cdot \overline{M0} + M1 \cdot M0$$

Therefore the resulting circuit is

