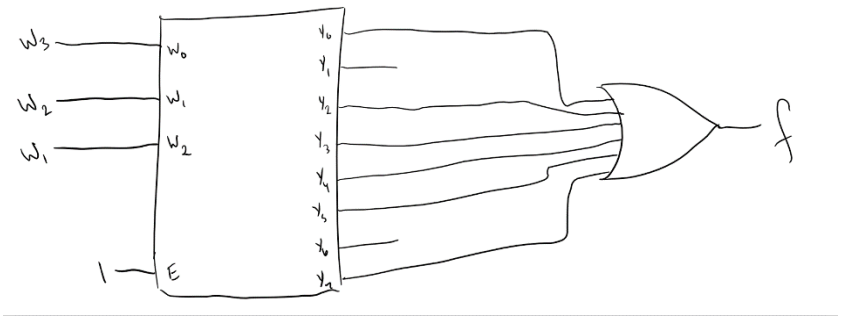
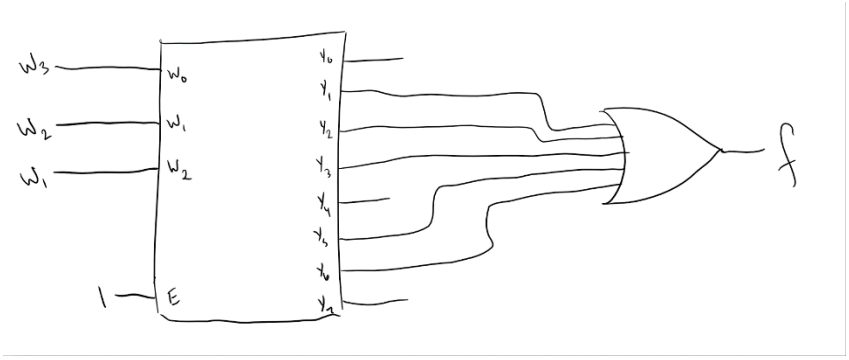
Marcus Domingo
ECE-301-002 HW7

6.1:



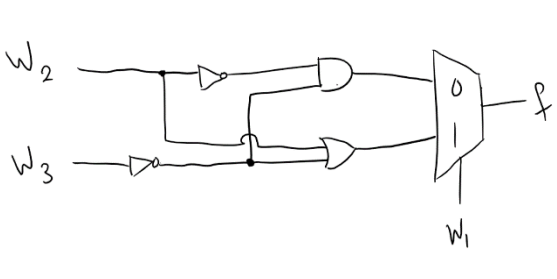
6.2:



6.4:

W1	W2	W3	f
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	1
1	1	1	1

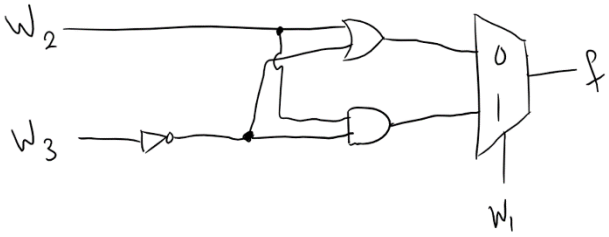
W1	f
0	~W2~W3
1	W2 + ~W3



Marcus Domingo
ECE-301-002 HW7

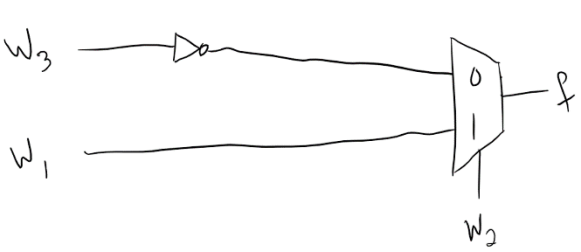
6.5: $f = \overline{w_1 w_2 w_3} + \overline{w_1} w_2 \overline{w_3} + \overline{w_1} w_2 w_3 + w_1 w_2 \overline{w_3}$

$= \overline{w_1}(\overline{w_3} + w_2) + w_1(w_2 \overline{w_3})$



6.6: $f = \overline{w_1 w_2 w_3} + w_1 \overline{w_2 w_3} + w_1 w_2 \overline{w_3} + w_1 w_2 w_3$

$= \overline{w_2}(\overline{w_3}) + w_2(w_1)$



b. Truth Table:

X3	X2	X1	X0	Y1	Y0
0	0	0	0	x	x
0	0	0	1	0	0
0	0	1	0	0	1
0	0	1	1	0	1
0	1	0	0	1	0
0	1	0	1	1	0
0	1	1	0	1	0
0	1	1	1	1	0
1	0	0	0	1	1
1	0	0	1	1	1
1	0	1	0	1	1
1	0	1	1	1	1
1	1	0	0	1	1
1	1	0	1	1	1
1	1	1	0	1	1
1	1	1	1	1	1

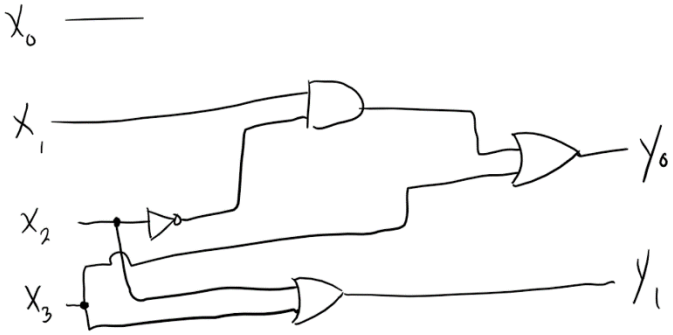
Karnaugh Maps:

Y1		X3X2			
		00	01	11	01
X1X0	00	0	1	1	1
	01	0	1	1	1
	11	0	1	1	1
	10	0	1	1	1

Y0		X3X2			
		00	01	11	01
X1X0	00	0	0	1	1
	01	0	0	1	1
	11	1	0	1	1
	10	1	0	1	1

Expressions:

Y1	X2 + X3
Y0	~X2X1 + X3



Marcus Domingo
ECE-301-002 HW7

c.

Num	Multiplied By	Output
00	0001	0000
00	0010	0000
00	0011	0000
00	0100	0000
01	0001	0001
01	0010	0010
01	0011	0011
01	0100	0100
10	0001	0010
10	0010	0100
10	0011	0110
10	0100	1000
11	0001	0011
11	0010	0110
11	0011	1001
11	0100	1100

A1	A0	B3	B2	B1	B0	Y3	Y2	Y1	Y0
0	0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0	0	0
0	0	0	0	1	1	0	0	0	0
0	0	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	1
0	1	0	0	1	0	0	0	1	0
0	1	0	0	1	1	0	0	1	1
0	1	0	1	0	0	0	1	0	0
1	0	0	0	0	1	0	0	1	0
1	0	0	0	1	0	0	1	0	0
1	0	0	0	1	1	0	1	1	0
1	0	0	1	0	0	1	0	0	0
1	1	0	0	0	1	0	0	1	1
1	1	0	0	1	0	0	1	1	0
1	1	0	0	1	1	1	0	0	1
1	1	0	1	0	0	1	1	0	0

The zeros represent A2 and A3 because the input number A1A0 is only 2 bits but we are multiplying by a 4 bit so we need to make A2 and A3 always zeros.