

# INF1400 - oblig 1

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# 1 Report

The delivery contains two circuits, one 3-bit converter with as few gates as possible, and one 4-bit converter which can display 0-F. I made two because the 3-bit converter felt too easy when the led is 'active on low' (It doesn't matter gate-wise, but it's much easier to implement). The 4-bit converter is split up in sub-circuits, the only interesting circuit was 'b', where a couple of gates could be replaced by an xor expression (ultimately, the xor ended up with 2 more gates than the three it was supposed to replace, but hey; it looks much cooler). Also a when the input value is over ten, the light in the bottom right corner turn on to indicate that hex values are shown.

$x_2$	$x_1$	$x_0$	$a$	$b$	$c$	$d$	$e$	$f$	$g$
0	0	0	0	0	0	0	0	0	1
0	0	1	1	0	0	1	1	1	1
0	1	0	0	0	1	0	0	1	0
0	1	1	0	0	0	0	1	1	0
1	0	0	1	0	0	1	1	0	0
1	0	1	0	1	0	0	1	0	0
1	1	0	0	1	0	0	0	0	0
1	1	1	X						

$F_a$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	1
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_b$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_c$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_d$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_e$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_f$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

$F_g$  ✓

$x_2$	$x_1$	$x_0$	
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

Figure 1: 3-bit sketch

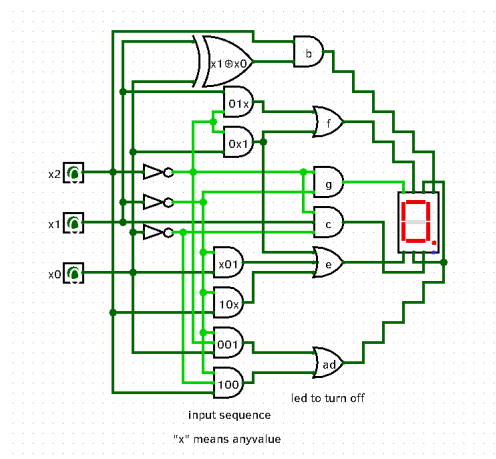


Figure 2: 3-bit circuit

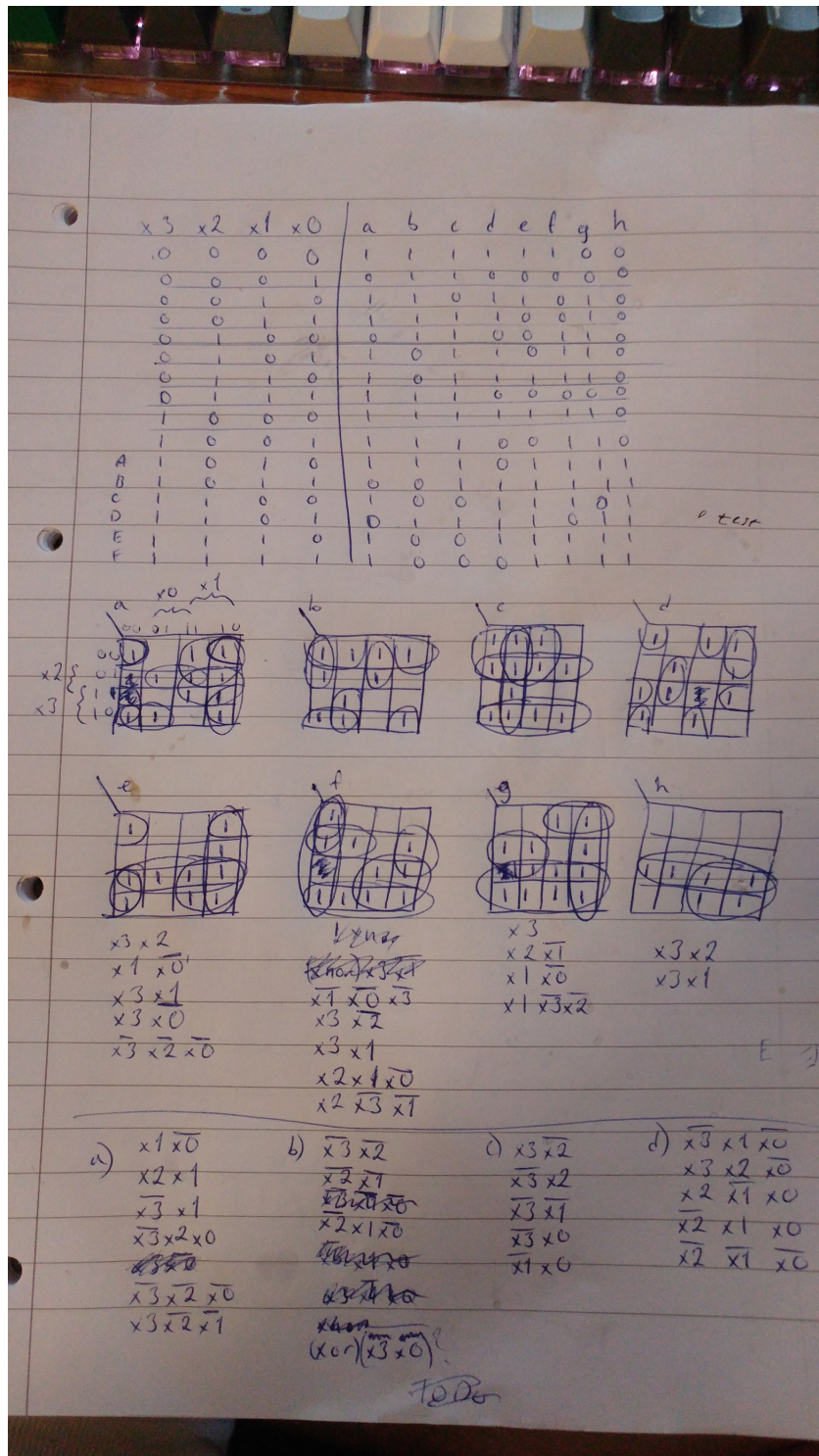


Figure 3: 4-bit sketch

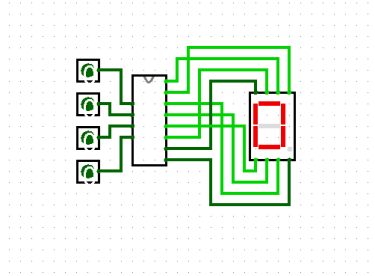


Figure 4: 4-bit circuit

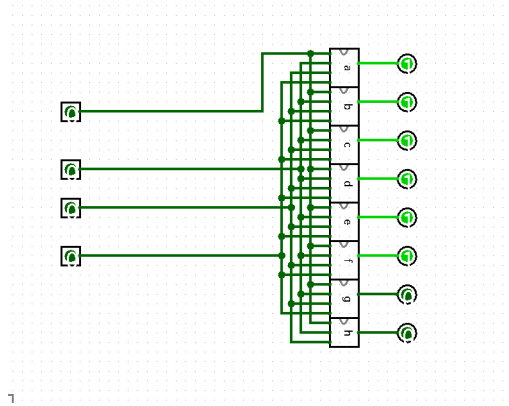


Figure 5: led circuit

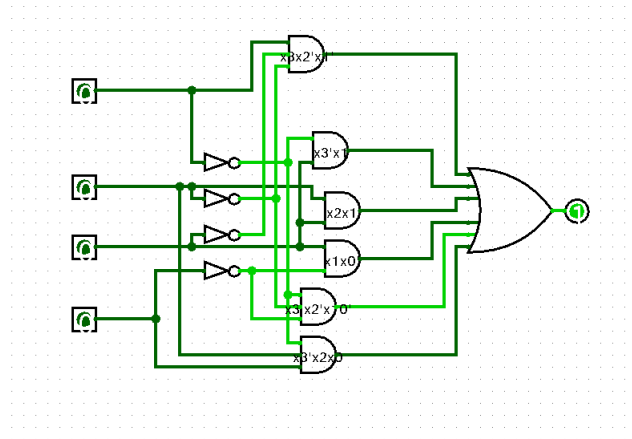


Figure 6: a circuit

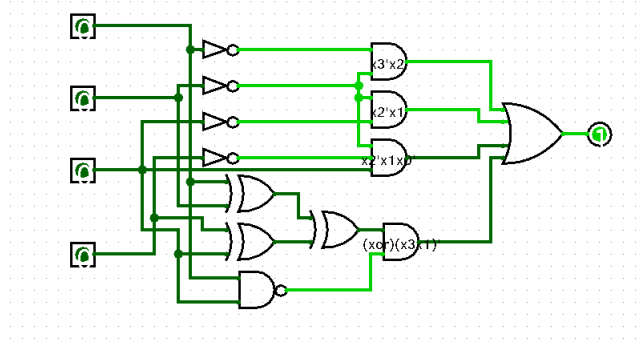


Figure 7: b circuit

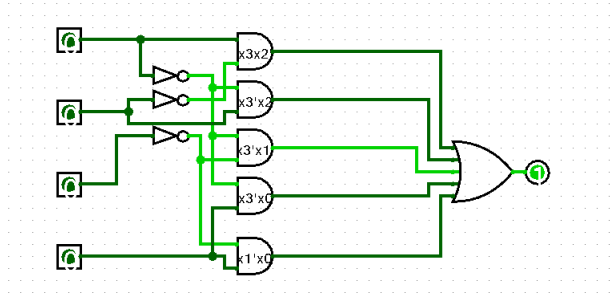


Figure 8: c circuit

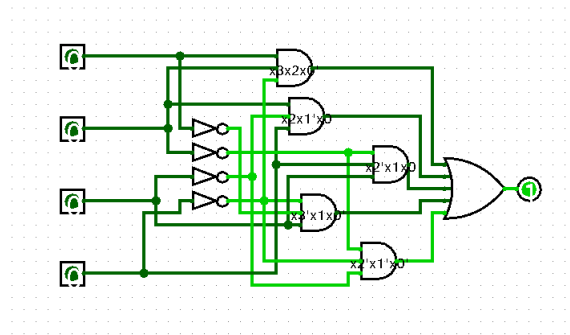


Figure 9: d circuit

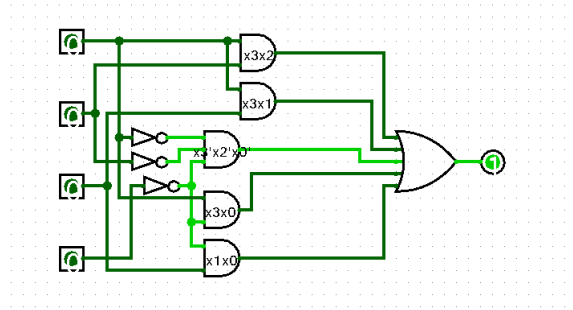


Figure 10: e circuit

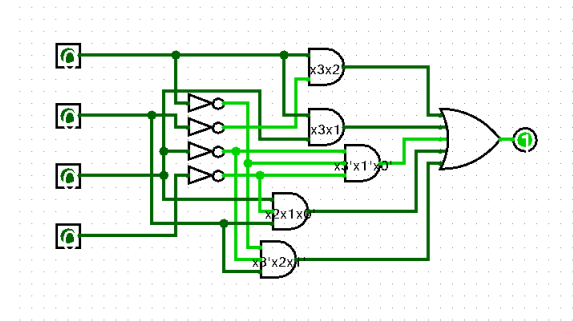


Figure 11: f circuit

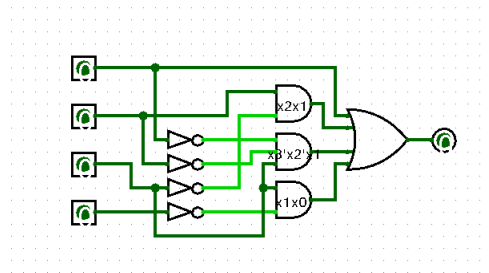


Figure 12: g circuit

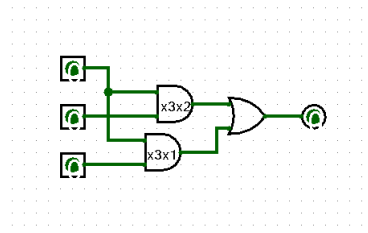


Figure 13: h circuit