

Alex Kim HW4 Truth Table / K-Maps

G	S ₂	S ₁	S ₀	N ₂	N ₁	N ₀	W	X	Y	Z
0	0	0	0	0	0	0	1	0	0	0
1	0	0	0	0	0	1	1	0	0	0
0	0	0	1	0	1	1	0	0	0	0
1	0	0	1	0	1	0	0	0	0	0
0	0	1	0	0	1	1	0	0	1	0
1	0	1	0	0	1	1	0	0	1	0
0	0	1	1	0	0	1	1	1	1	0
1	0	1	1	1	0	0	1	1	1	0
0	1	0	0	0	1	0	0	0	1	1
1	1	0	0	1	0	1	0	0	1	1
0	1	0	1	1	1	0	1	0	1	0
1	1	0	1	1	1	0	1	0	1	0
0	1	1	0	0	0	0	0	1	0	1
1	1	1	0	1	1	0	0	1	0	1

		S ₁ S ₀	
N ₂		00 01 11 10	
00		0 0 0 0	
01	G	0 1 X 0	
11		1 1 X 1	
10		0 0 1 0	

		S ₁ S ₀	
N ₁		00 01 11 10	
00		0 1 0 1	
01		1 1 X 0	
11		0 1 X 1	
10		0 1 0 1	

$$N_2 = S_2 S_0 + G S_2 + G S_1 S_0$$

$$N_1 = \bar{G} S_2 \bar{S}_1 + \bar{S}_1 S_1 + G S_1 \bar{S}_0 + \bar{S}_2$$

		S ₁ S ₀	
N ₀		00 01 11 10	
00		0 1 1 1	
01	G	0 0 X 0	
11		1 0 X 0	
10		1 0 0 1	

		S ₁ S ₀	
W		00 01 11 10	
00		1 0 1 0	
01		0 1 X 0	
11		0 1 X 0	
10		1 0 1 0	

$$N_0 = \bar{G} \bar{S}_2 \bar{S}_0 + G \bar{S}_1 \bar{S}_0 + \bar{S}_2 S_1 \bar{S}_0$$

$$W = \bar{S}_2 \bar{S}_1 \bar{S}_0 + S_2 S_0 + S_1 S_0$$

Z	00 01 11 10
00	0 0 0 0
01	1 0 X 1
11	1 0 X 1
10	0 0 0 0

$Z = S_2 \bar{S}_0$

		S ₁ S ₀	
X		00 01 11 10	
00		0 0 1 0	
01		0 0 X 1	
11		0 0 X 1	
10		0 0 1 0	

		S ₁ S ₀	
Y		00 01 11 10	
00		0 0 1 1	
01		1 1 X 0	
11		1 1 X 0	
10		0 0 1 1	

$Y = S_2 \bar{S}_1 + \bar{S}_2 S_1$