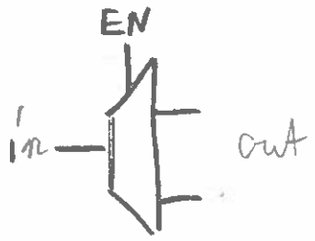
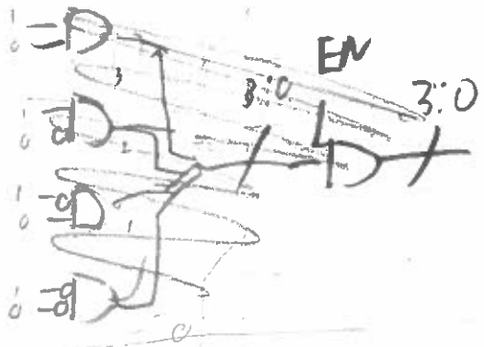


En	in_1	in_0	out_3	out_2	out_1	out_0
0	X	X	0	0	0	0
1	0	0	0	0	0	1
1	0	1	0	0	1	0
1	1	0	0	1	0	0
1	1	1	1	0	0	0

Boolean of in SV

$O_3 = EN \,\&\, \sim In_1 \,\&\, \sim In_0$
$O_2 = EN \,\&\, \sim In_1 \,\&\, In_0$
$O_1 = EN \,\&\, In_1 \,\&\, \sim In_0$
$O_0 = EN \,\&\, In_1 \,\&\, In_0$



En	in2	1	0	out	7	6	5	4	3	2	1	0
0	X	X	X		0	0	0	0	0	0	0	0
1	0	0	0		0	0	0	0	0	0	0	1
	0	0	1		0	0	0	0	0	0	1	0
	0	1	0		0	0	0	0	0	1	0	0
	0	1	1		0	0	0	0	1	0	0	0
	1	0	0		0	0	0	1	0	0	0	0
	1	0	1		0	0	1	0	0	0	0	0
	1	1	0		0	1	0	0	0	0	0	0
	1	1	1		1	0	0	0	0	0	0	0

Boolean of in SV

$O_0 = En \,\&\, \sim in_2 \,\&\, \sim in_1 \,\&\, \sim in_0$
$O_1 = En \,\&\, \sim in_2 \,\&\, \sim in_1 \,\&\, in_0$
$O_2 = En \,\&\, \sim in_2 \,\&\, in_1 \,\&\, \sim in_0$
$O_3 = En \,\&\, \sim in_2 \,\&\, in_1 \,\&\, in_0$
$O_4 = En \,\&\, in_2 \,\&\, \sim in_1 \,\&\, \sim in_0$
$O_5 = En \,\&\, in_2 \,\&\, \sim in_1 \,\&\, in_0$
$O_6 = En \,\&\, in_2 \,\&\, in_1 \,\&\, \sim in_0$
$O_7 = En \,\&\, in_2 \,\&\, in_1 \,\&\, in_0$

Half Adder

In.1	0	out	cry
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Boolean of in SV

$out = In[1] \wedge In[0]$
$cry = In[1] \,\&\, In[0]$

Full Adder

Cin	In 1	0	out	Cout
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

In_xor

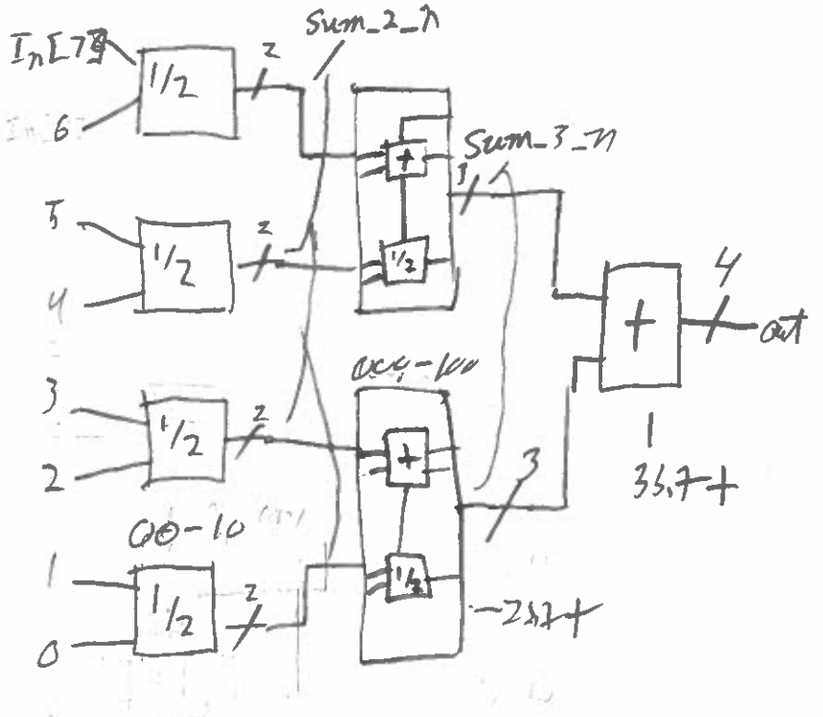
$out = Cin \wedge \boxed{In[1] \wedge In[0]}$

$Cout = \overline{Cin}\, In_1 In_0 + Cin \overline{In_1} In_0 + Cin\, In_1 \overline{In_0} + Cin\, In_1 In_0$
$\overline{Cin}\, In_1 In_0 + Cin(In_1 \oplus In_0) + C In_1 In_0$
$= In_1 In_0 + Cin(\boxed{In_1 \oplus In_0})$

$Cout = (In[1] \,\&\, In[0]) \,|\, (Cin \,\&\, In\_xor)$

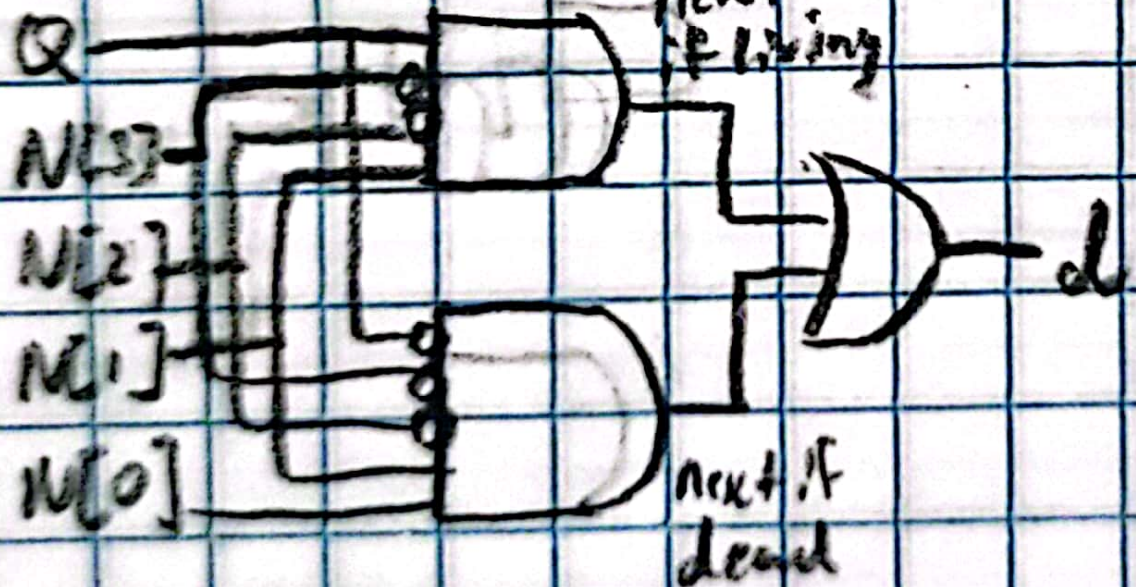
Count_inputs_8

in[7:0]	out[3:0]
#inputs	0000
that are	...
HIGH	1000

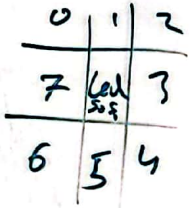


- Comparator (SOP)

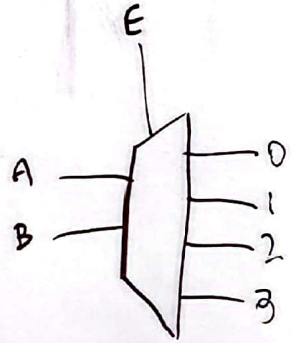
if Q=1,
if 2≤N≤3
d=1 else d=0
if Q=0
if N==3
d=1 else d=0

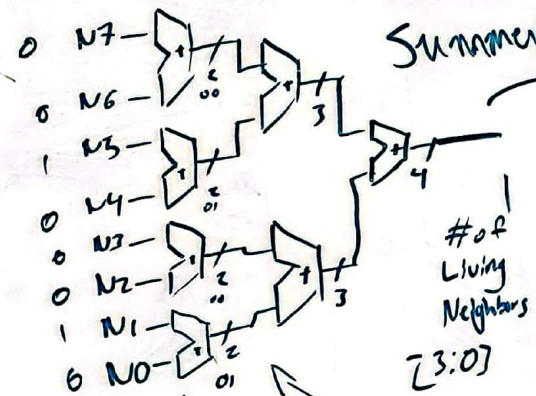


A	B	E	0 1 2 3
X	X	0	0 0 0 0
0	0	1	1 0 0 0
1	0	1	0 1 0 0
2	0	1	0 0 1 0
3	1	1	0 0 0 1

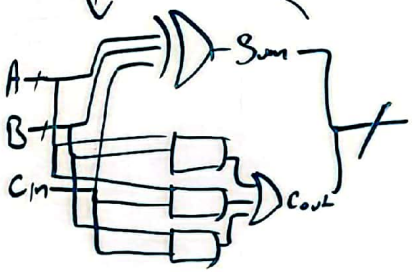


$\log_2 8$





Summer



[3:0] out

out = in[3] + in[2] + in[1] + in[0]

Next State

State	in[3:0]	
0	0 0 0 0	
	0 0 0 1	
	0 0 1 0	
	0 0 1 1	→ S ($\overline{in[3]}$ $\overline{in[2]}$ in[1] in[0])
	0 1 0 0	
	0 1 0 1	
	0 1 1 0	
	0 1 1 1	
	1 x x x	
1	0 0 0 0	
	0 0 0 1	→ S($\overline{in[3]}$ $\overline{in[2]}$ $\overline{in[1]}$ in[0])
	0 0 1 0	
	0 1 0 0	
	. . . .