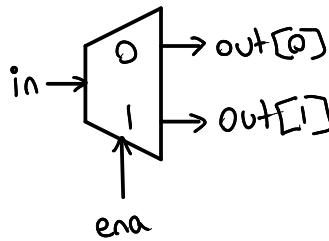


Decoder 1 to 2

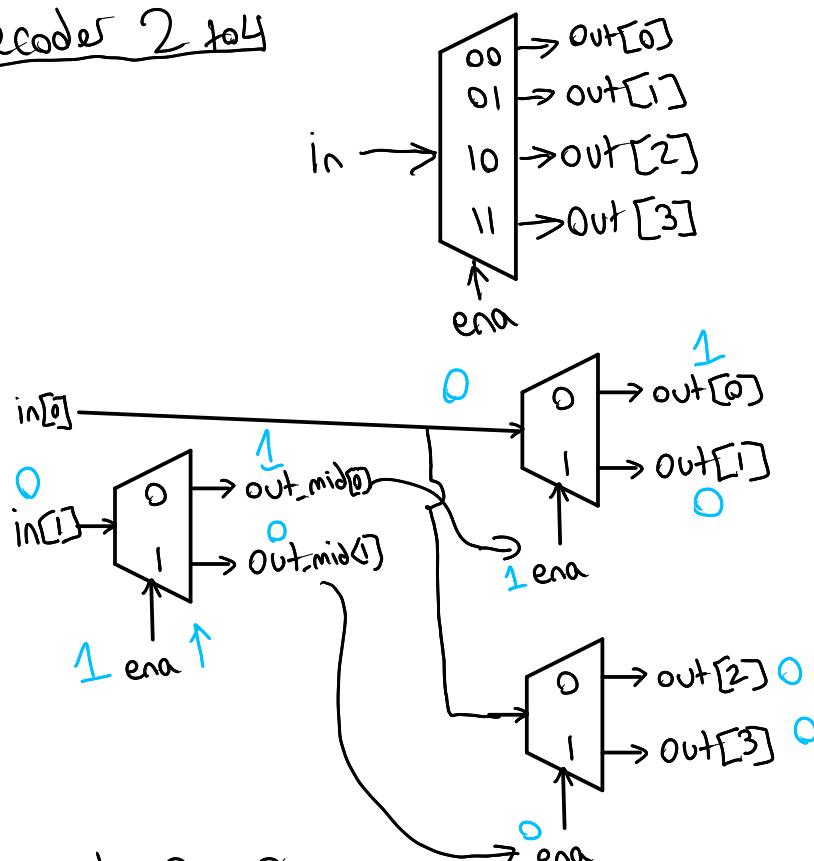


ena	in	out[0]	out[1]
0	0	0	0
0	1	0	0
1	0	0	1
1	1	1	0

$$out[1] = ena \cdot in$$

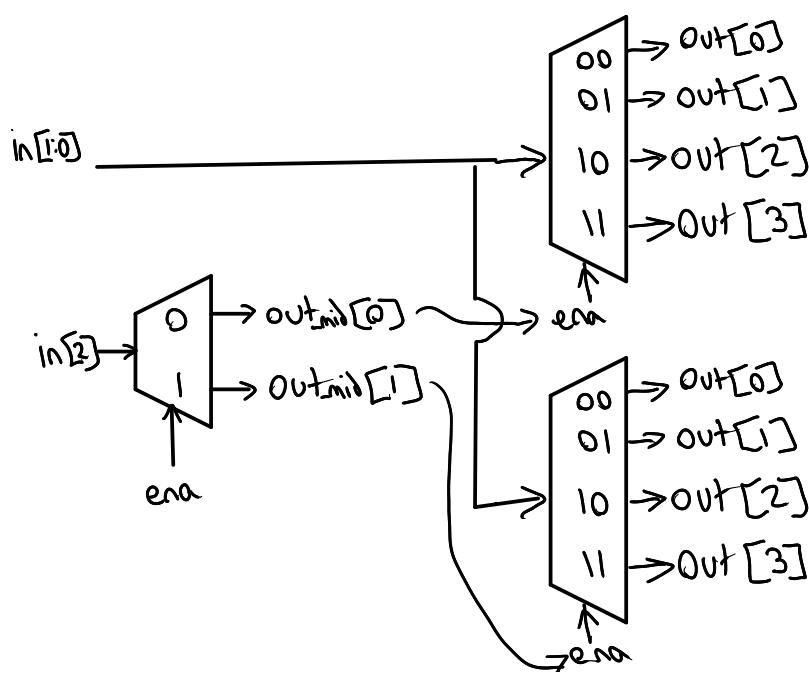
$$out[0] = ena \cdot \bar{in}$$

Decoder 2 to 4

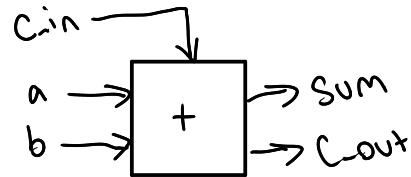


ena	in	out
0	X	0 0 0 0
1	00	0 0 0 1 ✓
1	01	0 0 1 0
1	10	0 1 0 0
1	11	1 0 0 0

Decoder 3 to 8



1 bit Adder

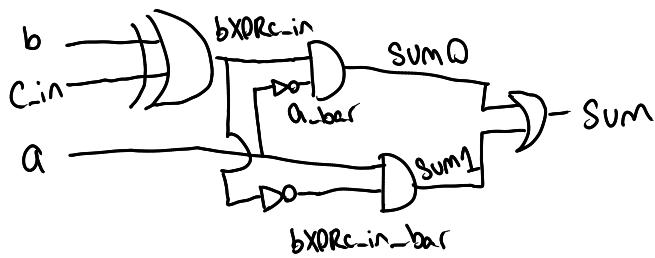


$$\text{Sum} = \bar{a} \cdot (b \otimes c_{\text{in}}) + a \cdot (\overline{b \otimes c_{\text{in}}})$$

$$c_{\text{out}} = \bar{a} \cdot (b \cdot c_{\text{in}}) + a \cdot (b + c)$$

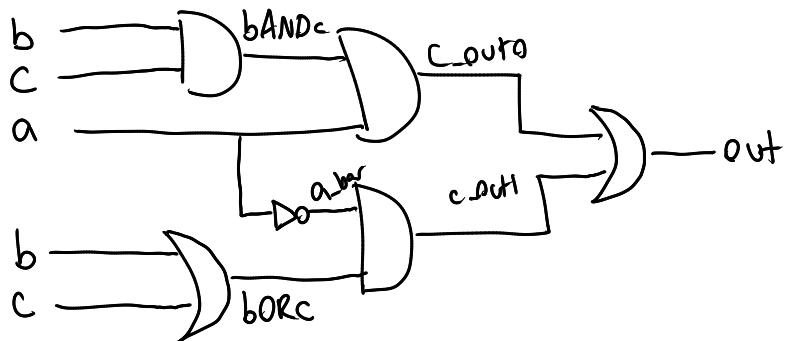
a	b	c _{in}	Sum	c _{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

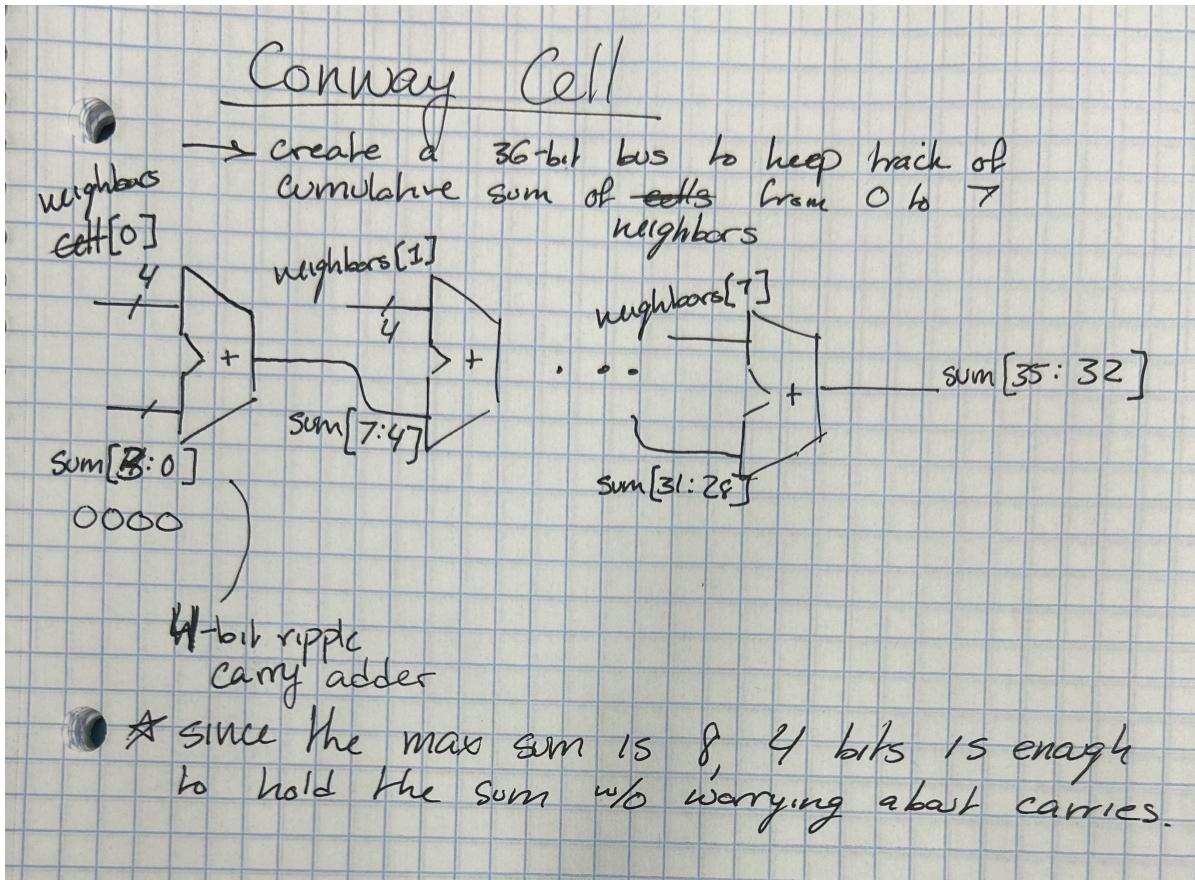
XOR AND OR



$$\text{Sum} = \bar{a} \cdot (b \otimes c_{\text{in}}) + a \cdot (\overline{b \otimes c_{\text{in}}})$$

$$c_{\text{out}} = \bar{a} \cdot (b \cdot c_{\text{in}}) + a \cdot (b + c)$$





LED DRIVER

