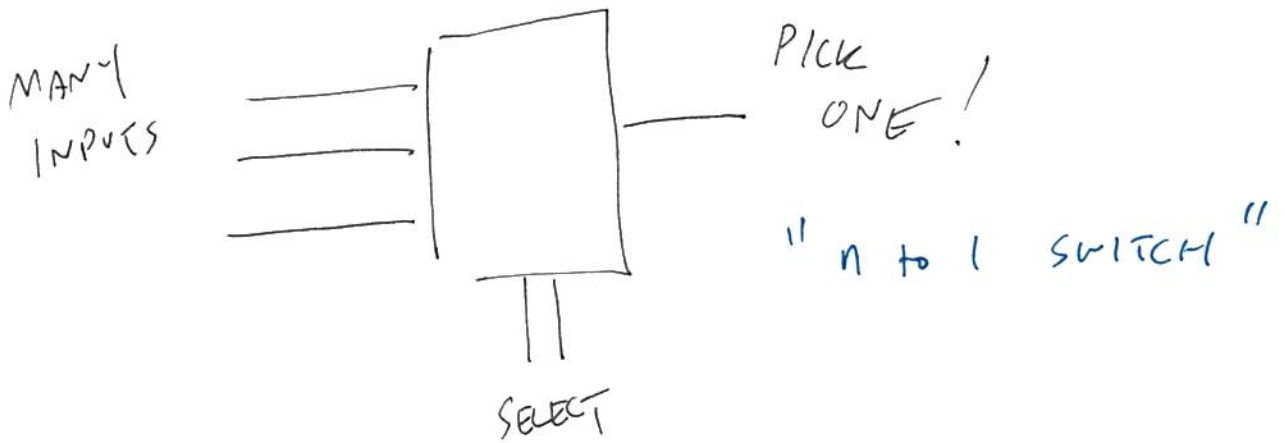
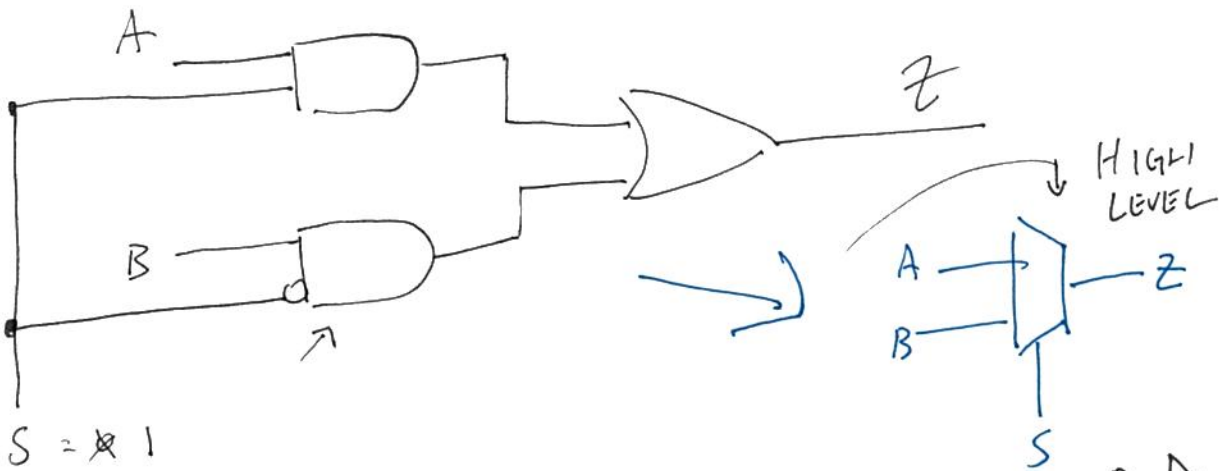


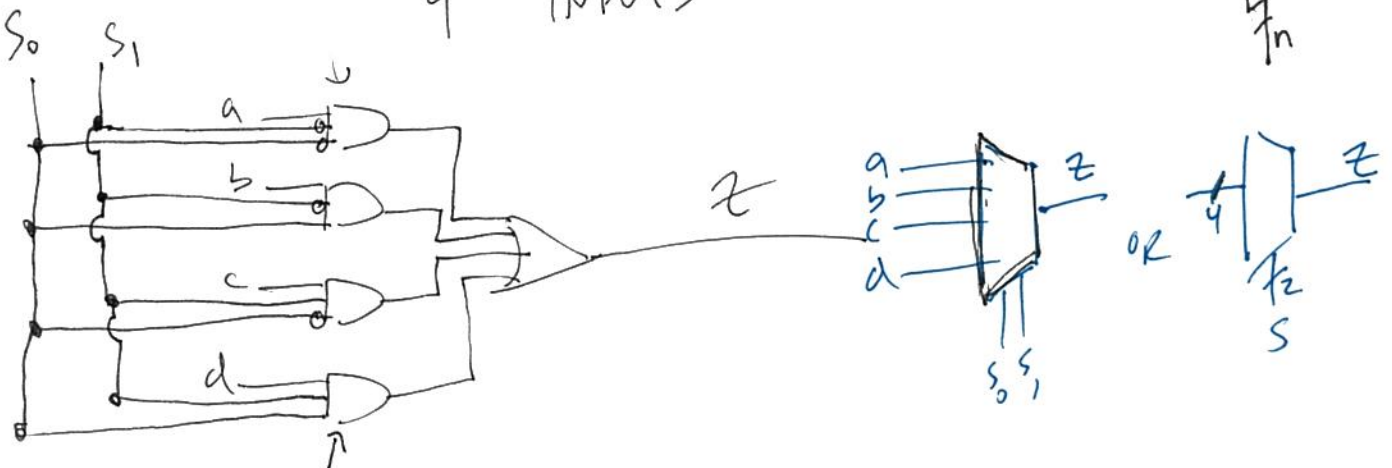
THE MULTIPLEXER



2 INPUTS



4 INPUTS

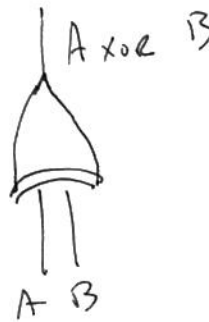


CALCULATOR

4 FUNCTIONS

- BITWISE AND (A, B)
- BITWISE OR (A, B)
- BITWISE XOR (A, B)
- BITWISE NOT (A)

WE ALREADY HAVE COMPONENTS!



WE NEED TO SELECT ONE BASED ON A NUMBER "OPCODE"

00 MEANS "AND"

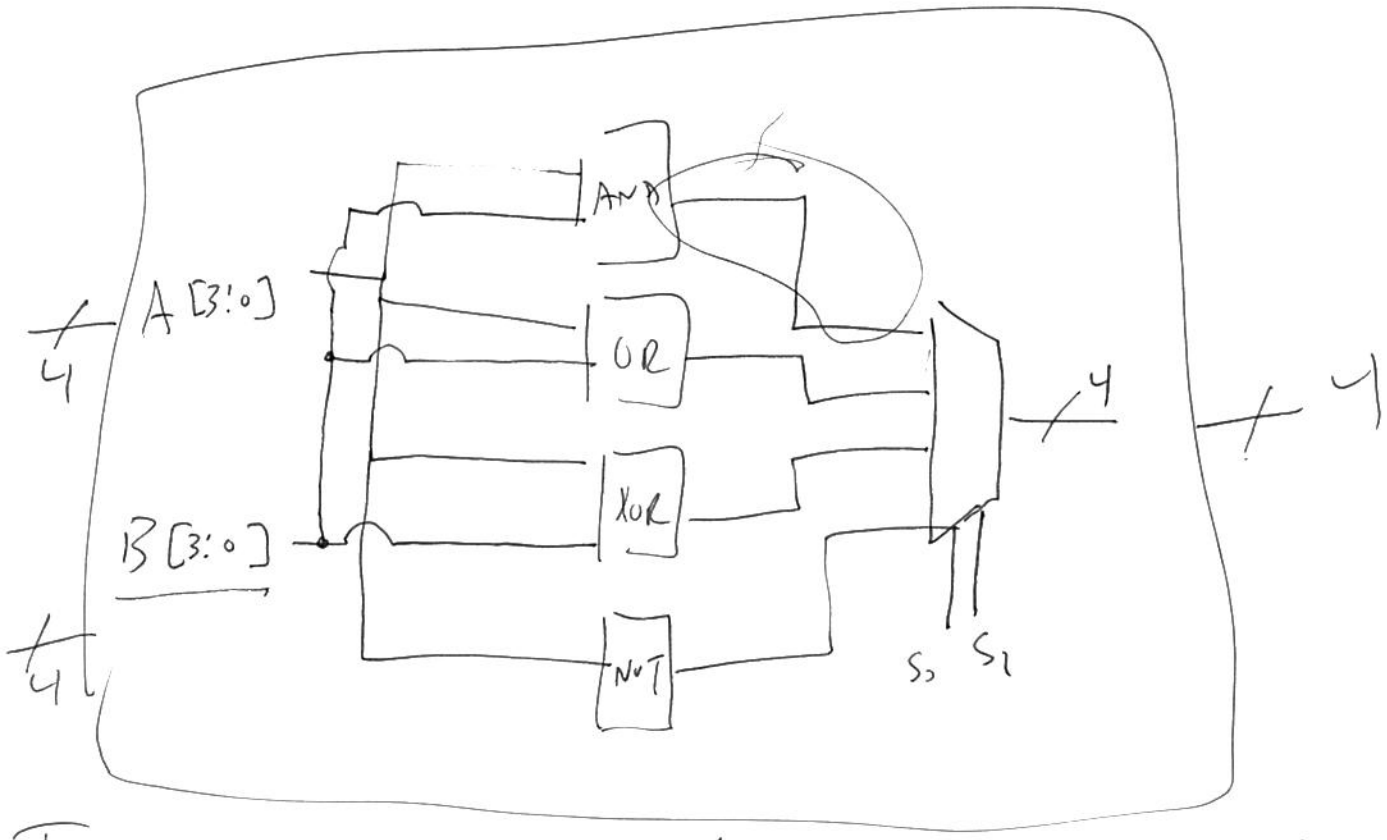
01 MEANS "OR"

10 MEANS "XOR"

11 MEANS "NOT"

(ALL IT
S[1:0])

???



I

ALU

O

S ₀	S ₁	
0	0	AND
0	1	OR
1	0	XOR
1	1	NOT

THE FULL ADDER

How To ADD 2 BINARY #'s?

MAKE A TRUTH TABLE!

INPUTS: A B ... C_{IN}

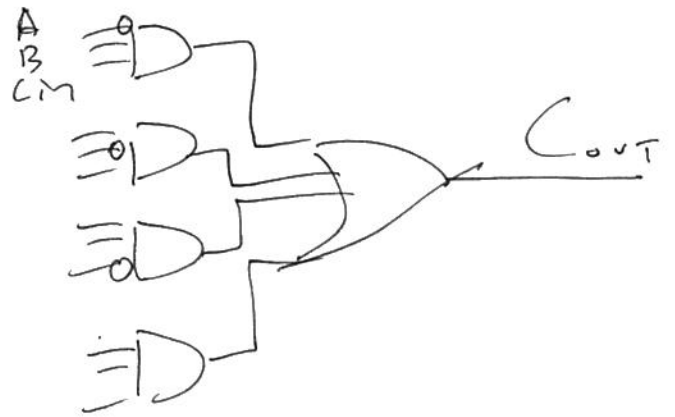
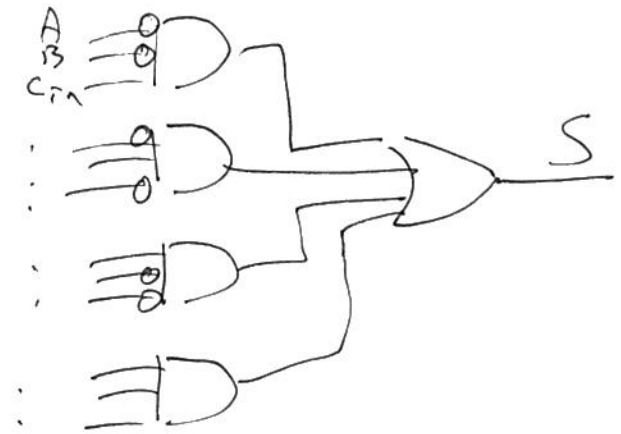
OUTPUTS: S ... C_{OUT}

C_{IN} C_{OUT}
1 0 1
+ 0 1
—
0

A	B	C_{IN}	S	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	↓	↓

$$S = \bar{A}\bar{B}C_{IN} + \bar{A}B\bar{C}_{IN} + A\bar{B}\bar{C}_{IN} + ABC_{IN}$$

$$C_{OUT} = \bar{A}BC_{IN} + A\bar{B}C_{IN} + ABC_{IN} + ABC_{IN}$$



1-bit ADDER

"FULL ADDER"

