

# 2020-09-03 CH 2

Thursday, September 3, 2020 8:03 AM

## Student Questions

- Binary addition

	1	1	1	1	1			1		1	
X	1	0	0	1	1	1	0	0	1	0	1
Y	0	1	1	1	0	1	1	0	1	0	1
1	0	0	0	1	0	0	1	1	0	1	0

$$1+4+32+64+128+1024 = 1253$$

$$1+4+16+32+128+256+512 = 949$$

$$2+8+16+128+2048=2202$$

$$1253+949=2202$$

- Negative numbers / 2s compliment
  - $X + -X = 0$
  - To negate ANY number, NOT each bit, then add 1

## Positive and Negative 1

0	0	0	0	0	0	0	1
1	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1

## Positive and Negative 5

0	0	0	0	0	1	0	1
1	1	1	1	1	0	1	0
1	1	1	1	1	0	1	1
					1	0	1
0	0	0	0	0	0	0	0

## Positive and Negative 12

+12	0	0	0	0	1	1	0	0
-12 (intermediate)	1	1	1	1	0	0	1	1
-12 (finished)	1	1	1	1	0	1	0	0
-12 + 12	0	0	0	0	0	0	0	0

Positive-only range: 0-255

w/ negatives: +/- 127

- ALU