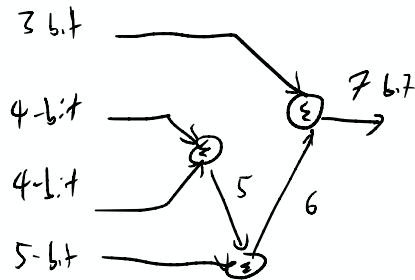


NUMBER SYSTEMS

Unsigned! with n bits, can represent values from $[0, 2^n - 1]$



10	a	01	a	10
11	\bar{a}	10	\bar{a}	01
00	$\bar{a}+1$	11	$\bar{a}+1$	10
01				

Two's complement

w/ two bits $[-2, +1]$

w/ three bits $[-4, 3]$

w/ n bits $[-2^{n-1}, 2^{n-1}-1]$

-4	1	0	0
-3	1	0	1
-2	1	1	0
-1	1	1	1
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1

• left most bit still sign

• locate rightmost 1, flip all bits left of it to get max.

TC (10110)

\bar{x} : 01001

$\bar{x}+1$: 01010 = 10

10110

01010 = 10

can use place values, w/ left most as negative.

TC: $-1 \times 2^4 + 1 \times 2^3 + 1 \times 2^1$

= $-16 + 4 + 2$

= -10

• works well w/ addition/subtraction rules
↳ better than having signed bit.