

Recap: Encoding Bytes

Hex	Decimal	Binary
0	0	0000
1	1	0001
2	2	0010
3	3	0011
4	4	0100
5	5	0101
6	6	0110
7	7	0111
8	8	1000
9	9	1001
A	10	1010
B	11	1011
C	12	1100
D	13	1101
E	14	1110
F	15	1111

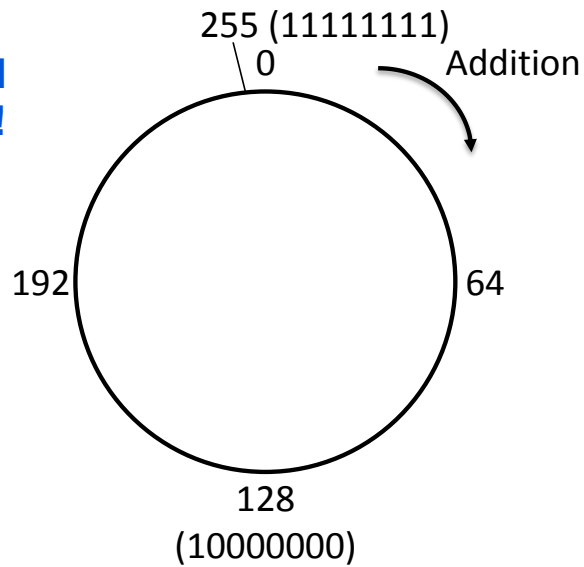
Type	Bytes
char	1
short	2
int	4
long	8
float	4
double	8

Binary Arithmetic

$$\begin{array}{r} 1 \\ 0110 \\ + 0100 \\ \hline 1010 \end{array} \qquad \begin{array}{r} 6 \\ + 4 \\ \hline 10 \end{array}$$

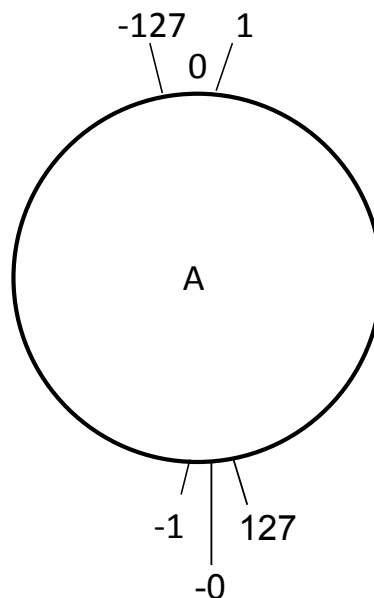
Modular Arithmetic

Unsigned numbers!

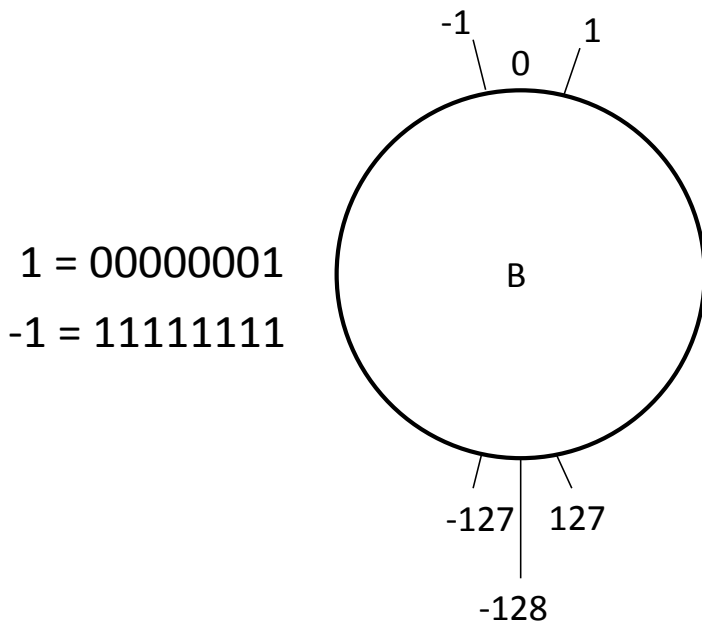


Signed Magnitude

1 = 00000001
-1 = 10000001



Two's Complement



Signed vs Unsigned

Bits	Signed	Unsigned
0000	0	0
0001	1	1
0010	2	2
0011	3	3
0100	4	4
0101	5	5
0110	6	6
0111	7	7
1000	-8	8
1001	-7	9
1010	-6	10
1011	-5	11
1100	-4	12
1101	-3	13
1110	-2	14
1111	-1	15