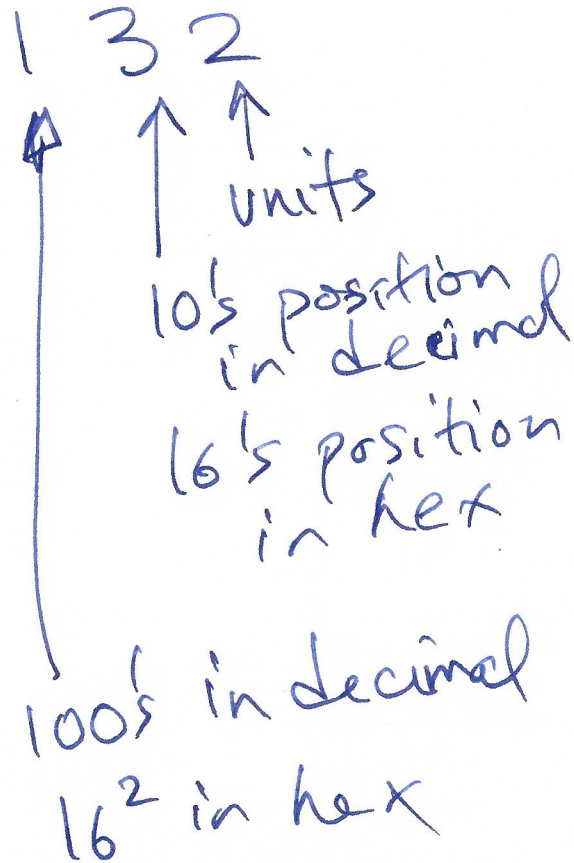


2 = 2 in any base



# Majority Function

A	B	C	Out
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

$$\text{Out} = A'BC + AB'C + ABC' + ABC$$

$$(a+b)(a+b') = \underset{\substack{| \\ a}}{aa} + \boxed{ab' + ab} + \cancel{\boxed{bb'}}$$
$$= a + \underset{\substack{|| \\ a}}{a(b'+b)} = a + a = a$$

$x_1$	$x_2$	$f$
0	0	1
0	1	1
1	0	0
1	1	1

$$f = x_1' x_2' + x_1' x_2 + x_1 x_2$$

$$= x_1' (x_2' + x_2) + x_1 x_2$$

$$= x_1' + x_1 x_2$$

$$f = x_1' x_2' + x_1' x_2 + x_1 x_2$$

$$= x_1' x_2' + x_1' x_2 + x_1' x_2 + x_1 x_2$$

$$= x_1' (x_2' + x_2) + x_2 (x_1' + x_1)$$

$$= x_1' + x_2$$

Row	$x_1$	$x_2$	$x_3$	$f$
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	<del>0</del>	0	0	1
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$$\begin{aligned}
 f &= x_1' x_2' x_3 + x_1 x_2' x_3' + x_1 x_2' x_3 + x_1 x_2 x_3' \\
 &= x_2' x_3 (x_1' + x_1) + x_1 x_3' (x_2' + x_2) \\
 &= x_2' x_3 + x_1 x_3'
 \end{aligned}$$

Row	$x_1$	$x_2$	$x_3$	$f$
0	0	0	0	0
1	0	0	1	1
2	0	1	0	0
3	0	1	1	0
4	1	0	0	1
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$$\begin{aligned}
 f &= \prod M(0, 2, 3, 7) \\
 &= (x_1 + x_2 + x_3) \cdot \\
 &\quad (x_1 + x_2' + x_3) \cdot \\
 &\quad (x_1 + x_2' + x_3') \cdot \\
 &\quad (x_1' + x_2' + x_3')
 \end{aligned}$$