

ECGR 2181 - 9/9/09

①

- 8bit unsigned number

XXXX XXXX

↙
0 = positive
1 = positive

Range

= 0 to $2^8 - 1$
= 0 to 255

- 8bit two's complement number

XXXX XXXX

↙
0 = positive
1 = negative

Range

-2^7 to $(2^7 - 1)$
-128 to 127

$-64_{10} \rightarrow$ 16-bit two comp number (binary)

$64_{10} \rightarrow 100\ 0000 = 2^6$

0000 0000 0100 0000 (16 bits) = 64_{10}

1111 1111 1011 1111
+

1111 1111 1100 0000 = -64_{10}
x F F C 0

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$F = a \text{ AND NOT } (b \text{ OR NOT } (c))$ (2)

a	b	c	$b \text{ OR NOT } (c)$	$\text{NOT } (b \text{ OR NOT } (c))$	F
0	0	0	1	0	0
0	0	1	0	1	0
0	1	0	1	0	0
0	1	1	1	0	0
1	0	0	1	0	0
1	0	1	0	1	1
1	1	0	1	0	0
1	1	1	1	0	0

P	s	k	$P \cdot s' \cdot k$	$F = P \cdot s' \cdot k$
0	0	0	0	
0	0	1	0	
0	1	0	0	
0	1	1	0	
1	0	0	0	
1	0	1	1	
1	1	0	0	
1	1	1	0	

$(s + k)'$

$s' \cdot k$

Interesting

$$P \cdot s' \cdot k = a \cdot (b + c)'$$

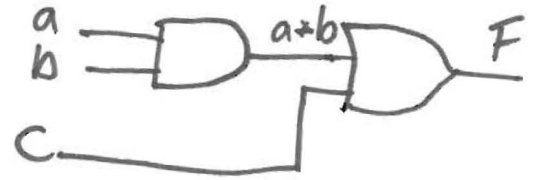
$$P \cdot s' \cdot k = P \cdot (s + k)'$$

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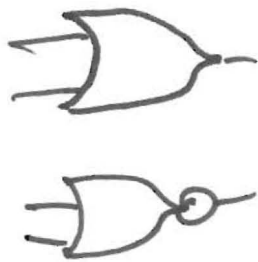
(3)

$$F = a * b + c$$

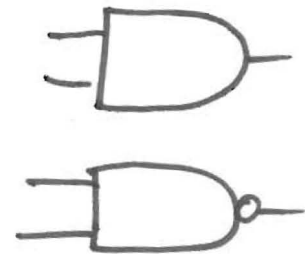
a	b	c	$a * b$	$a * b + c$
0	0	0	0	0
0	0	1	0	1
0	1	0	0	0
0	1	1	0	1
1	0	0	0	0
1	0	1	0	1
1	1	0	1	1
1	1	1	1	1



OR Gate art:



AND Gate art:



$$F = (ac)'$$

$$F = a' + c'$$

a	c	ac	ac	$(ac)'$	$a' + c'$
0	0	0	0	1	1
0	1	0	0	1	1
1	0	0	0	1	1
1	1	1	1	0	0

$$(ac)' = a' + c'$$

Memorize