

9/08/09 outline

- Collect homework 2
- Questions on conversions
- Questions on 2's complement
- Questions on NOT, OR, AND / Truth Tables
- $F = ((\text{NOT } A) \text{ OR } B) \text{ OR } ((\text{NOT } B) \text{ AND } C)$
- Slide 12 Boolean Equations from English
- Gates w timing diagrams
- Building Circuits Using Gates (Slide 16)
A few Examples
- Use symbols instead of Names (slide 19)
- Examples (slide 20)
- Boolean Terminology (Slide 21)
- Boolean Algebra Properties
- Examples

Example

2's complement

$$\begin{array}{r} -11 \\ -5 \\ \hline ? \end{array}$$

-11 in 2's complement

$$\begin{array}{l} 11 \\ \hline 2 = 1 \\ 5 \\ \hline 2 = 1 \\ 2 \\ \hline 2 = 0 \\ 1 \\ \hline 2 = 1 \end{array}$$

$$+11_{10} = 1011_2$$

Sign Extension

$$00001011_2$$

$$\begin{array}{r} -11_{10} = 11110100 \\ + \phantom{-11_{10}} 1 \\ \hline 11110101_2 \end{array}$$

- 1) invert bits
- 2) +1

-5 in 2's complement form

$$+5 = 101_2$$

$$+5 = 0000101_2$$

$$-5 = 1111011_2$$

$$\begin{array}{r} 11110101 \\ - 1111011 \\ \hline 1111010 \end{array}$$

$$\begin{array}{l} (-11) \\ - (-5) \end{array}$$

$$\begin{array}{r} 1 \times 13 \\ - 9 \\ \hline \end{array}$$

Overflow Flag

6

$$\begin{array}{l} 6 = 0000110_2 \\ 6 = 1111010_2 \end{array}$$

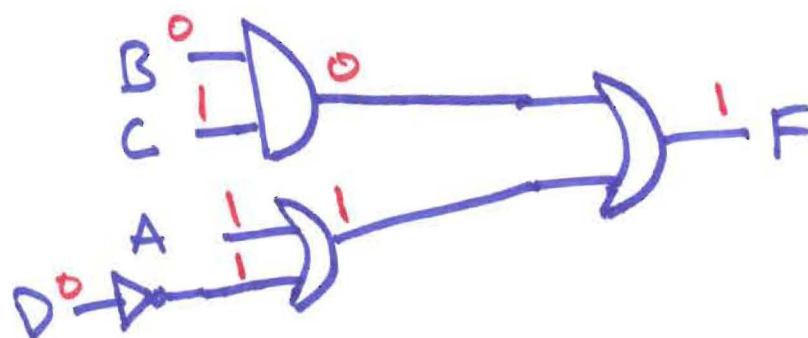
?

$$F = (B \text{ AND } C) \text{ OR } (\text{NOT}(D) \text{ OR } A)$$

A=1
B=0
C=1
D=0

(not D)

not (D)



$$\begin{aligned}
 f &= c'hp + c'hp' + c'h'p \stackrel{?}{=} hc' + h'pc' \\
 &= c'(hp + hp' + h'p) \\
 &= c'(h(p+p')) + h'p \\
 &= c'(h + h'p) \\
 &= hc' + h'pc'
 \end{aligned}$$

- distributive
- distributive

complement

Distributive