

CE2210, Sec. B

Homework 4

Evan Wilcox

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1. (a)

$$(b) \frac{1}{0.25(0.8)+0.5(0.8)} = 1.66\text{HZ}$$

(c)

$$2. \ t_{pO,NAND} + 2(t_{pL,NAND}) + t_{pO,NOR} + 2(t_{pL,NOR}) + t_{pO,NOR} \\ 0.85 + 2(0.95) + 0.75 + 2(0.9) + 0.85 = 6.15\text{ns}$$

3. Construct 4:1 MUX using only 2:1 MUXs as the main building blocks.

4. Use an 8:1 MUX to implement the function: $Q = ab + b\bar{c}$

5. (a) $1100\ 0110 + 0100\ 1100$

$$\begin{array}{r} \\ \\ + \\ \hline 1 \end{array}$$

(b) $1101\ 0000 + 1010\ 1010$

$$\begin{array}{r} 1101\ 0000 \\ +\ 1010\ 1010 \\ \hline 1\ 0111\ 1010 \end{array}$$

6. (a) $15 - 6 = 15 + (-6)$

$$6_{10} = 0110_2$$

2's compliment of 0110: 1010

$$\begin{array}{r} 11 \\ 1111 \\ + 1010 \\ \hline 1 \quad 1001 \end{array}$$

$$1001_2 = 9_{10}$$

(b) $196 - 114 = 196 + (-114)$

$$114_{10} = 01110010_2$$

2's compliment of 0110: 1000 1110

$$\begin{array}{r} \\ \\ + \\ \hline 1 \end{array}$$

$$0101\ 0010_2 = 82_{10}$$

7. (a) 1011×1011

$$\begin{array}{r} 1011 \\ x 1011 \\ \hline 1011 \\ 1011 \\ 0000 \\ 1011 \\ \hline 1111001 \end{array}$$

(b) 1110×0110

$$\begin{array}{r} 1110 \\ x 0110 \\ \hline 0000 \\ 1110 \\ 1110 \\ 0000 \\ \hline 1010100 \end{array}$$

8. Design a transmission gate network that implements the function

$$F = x\bar{y} + \bar{x}y$$