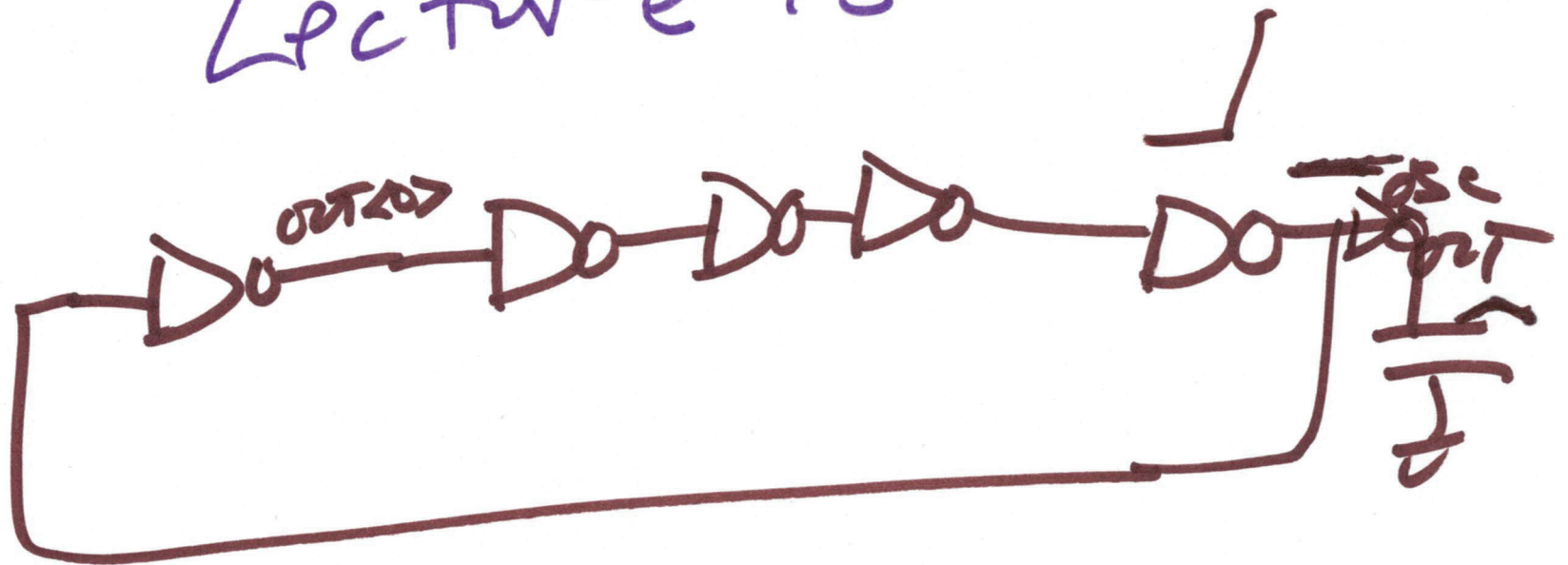
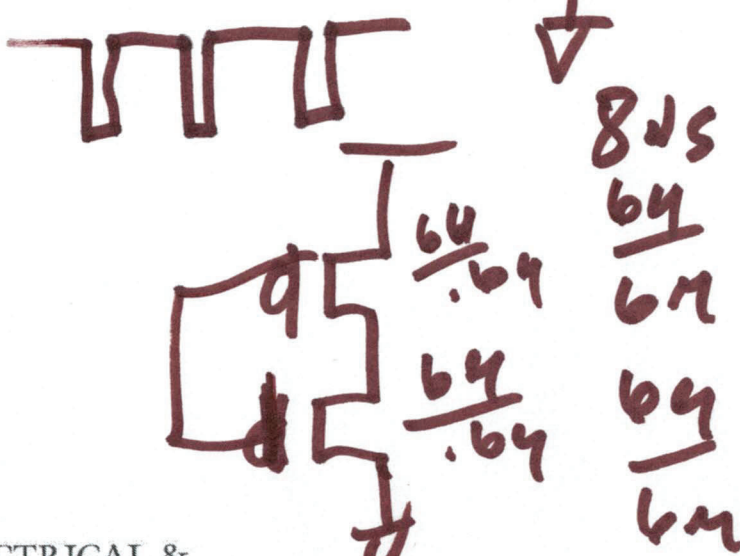
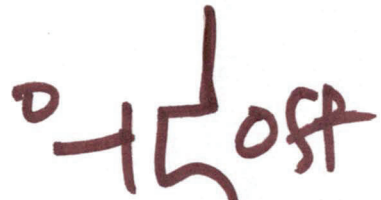
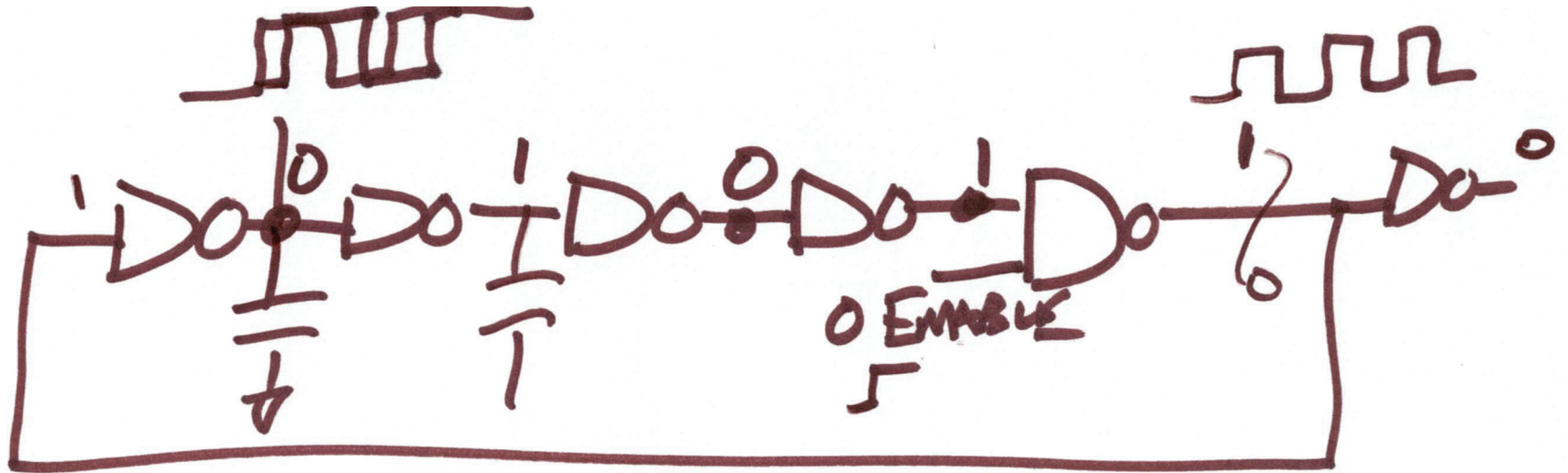


EE 421 / ECG 621
Digital IC Design
Nov. 1, 2023
Lecture 18





$$V_{out} = D \cdot V_{DD}$$

$$3.125 = D \cdot 4$$

$$D = \frac{3.125}{4}$$

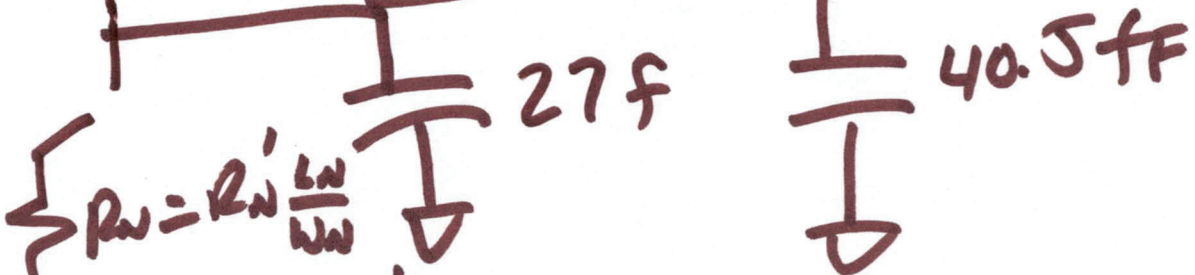
$$D = \frac{2.125}{4}$$



2)



$$R_p = R_p' \cdot \frac{L}{W} = 40K \cdot \frac{6}{12} = 2K$$



$$f_{osc} = \frac{1}{(t_{PH2} + t_{PH1}) \cdot N}$$

$$R_W = R_W' \cdot \frac{L_W}{W_W} = 20K \cdot \frac{6}{6} = 2K$$

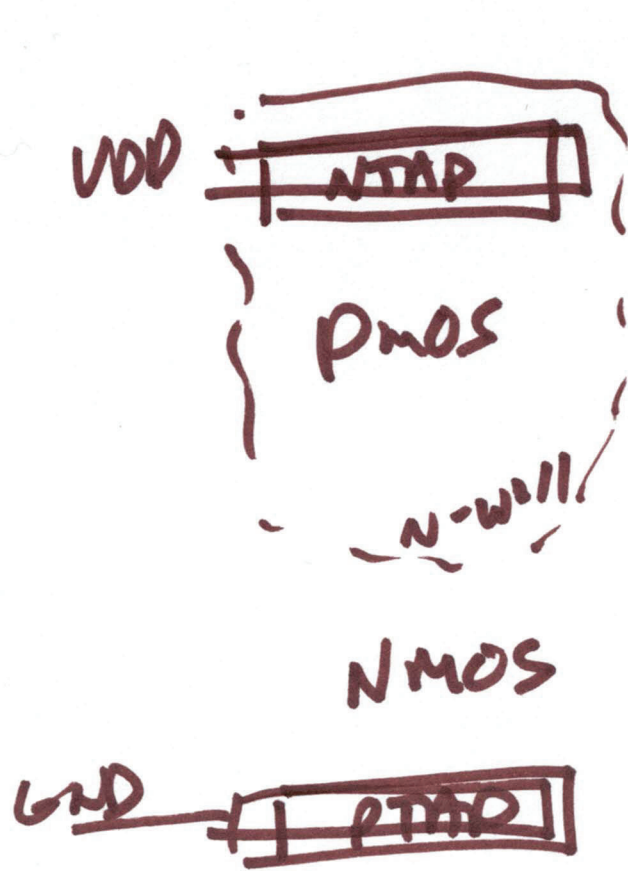
$$= \frac{1}{2.94.5ps \cdot 31} = 2K$$

$$= 170 MHz \approx t_{PHL} = R_W \cdot 67.5fF \cdot 0.7 = t_{PH1}$$

$$\approx 6 NS \text{ period} = R_p \cdot 67.5fF \cdot 0.7$$

$$= 2K \cdot 0.7 \cdot 67.5fF \approx 94.5ps$$

3)



~~NAND~~ NOR

