

MOS Circuits

Last updated 1/11/24

Gain Stage

- Determine V_{out} for various values of V_{in}

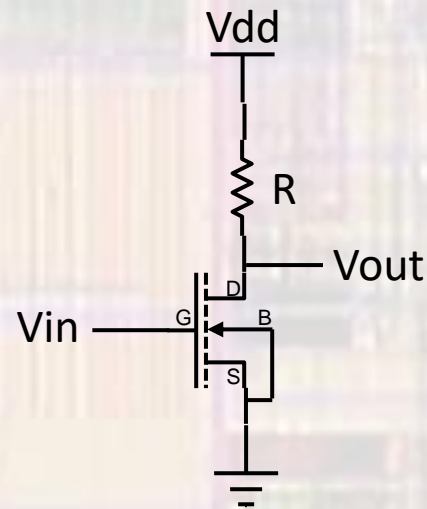
$$k' = 5\text{mA/V}^2$$

$$V_t = 1\text{V}$$

$$W/L = 10$$

$$V_{dd} = 3\text{V}$$

$$R = 100\Omega$$



Current Source

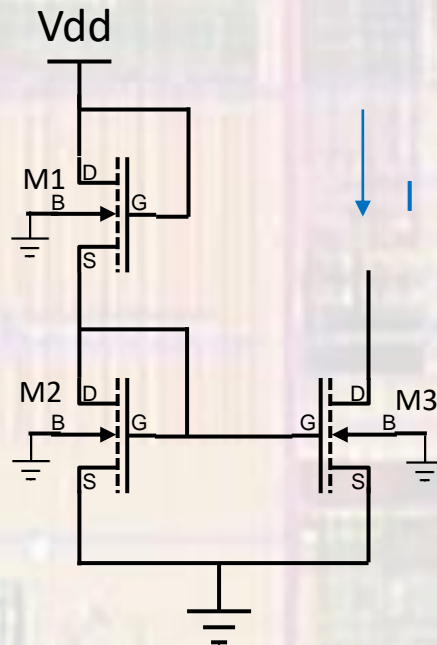
- Determine the value of I

$$V_{dd} = 3.3V$$
$$k' = 5\text{mA}/V^2$$
$$V_t = 1V$$

$$M1: W/L = 10$$

$$M2: W/L = 10$$

$$M3: W/L = 20$$



Inverter

- Provide the value for W_{M2} to make a symmetric switching point

$$V_{dd} = 3.3V$$

$$V_{tn} = V_{tp} = 1V$$

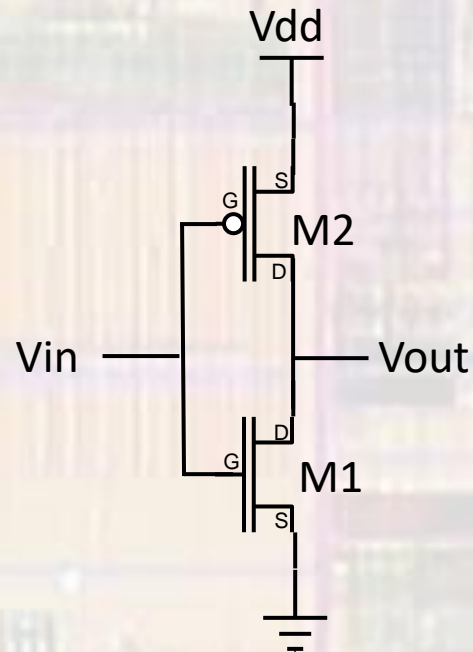
$$k'_n = 3mA/V^2$$

$$k'_p = 1mA/V^2$$

$$M1: W=10nm$$

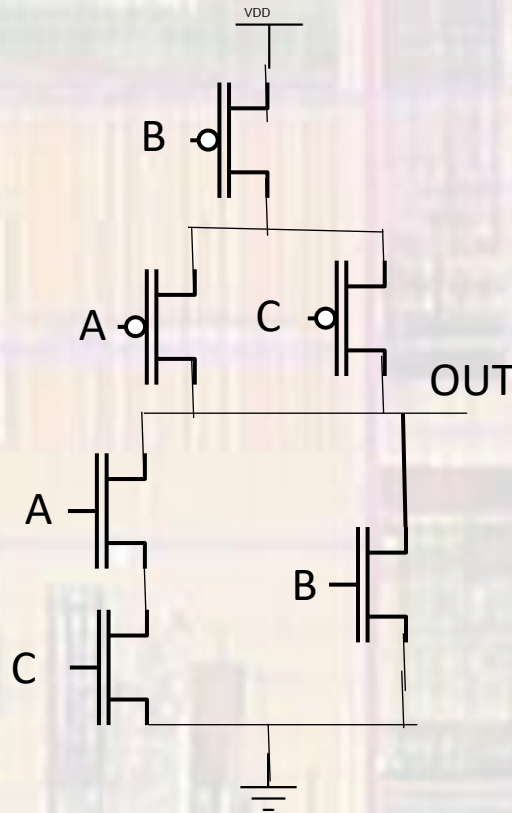
$$M1: L = 5nm$$

$$M2: L = 5nm$$



Compound Logic Gate

- Provide a minimized logic equation for the following CMOS gate



Mystery Circuit

- What is the purpose of this logic gate

