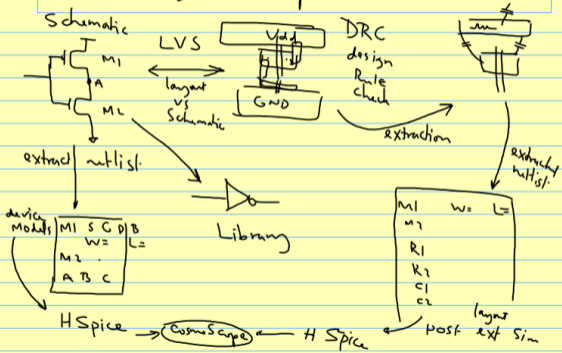


# [Design Steps]

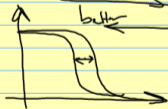
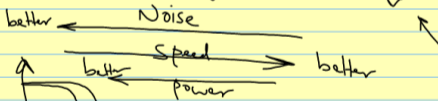
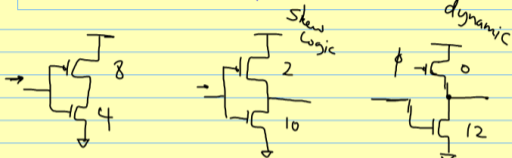


$$V_M \quad \text{and} \quad r=1 \quad \left( \begin{array}{l} \text{b/c want} \\ V_M = \frac{1}{2} V_{DD} \end{array} \right)$$

$$r = \frac{k_p V_{dsatp}}{k_n V_{dsatn}} = \frac{\left( \cancel{\mu} \cancel{C_{ox}} \frac{W}{L} \right)_p}{\left( \cancel{\mu} \cancel{C_{ox}} \frac{W}{L} \right)_n} \cdot \frac{V_{dsatp}}{V_{dsatn}} = 1$$

$$\frac{W_p}{W_n} = \frac{\mu_n}{\mu_p} \cdot \frac{\cancel{V_{dsatp}}}{\cancel{V_{dsatn}}} \approx 2$$

# NOISE vs Speed



$$\text{delay} \propto \frac{1}{w}$$