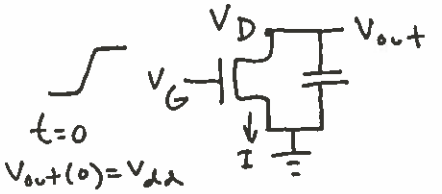
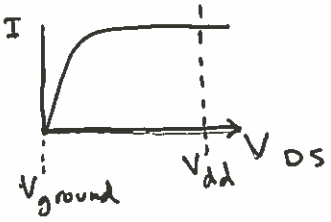
Postlab 5

Ruby Spring

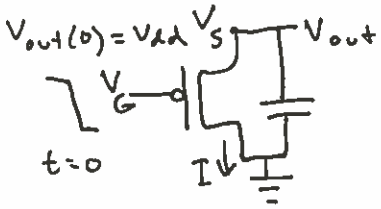
nMOS { $V_G = V_{dd}$ → closed, logic 1
$= 0$ → open, logic 0
strong 0

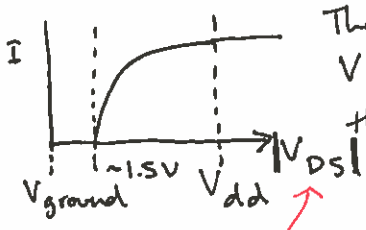
pMOS { $V_G = V_{dd}$ → open, logic 0
$= 0$ → closed, logic 1
strong 1





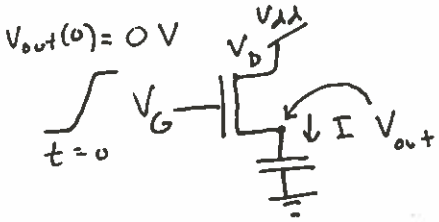
The "capacitor" discharges, and as V_{DS} ↓, V_{GD} ↑ and I ↓.
because V_{GD} is increasing, the transistor stays on until $V_D = V_S = V_{ground}$ and no more current can flow ($I = 0$). thus this yields a **strong 0**

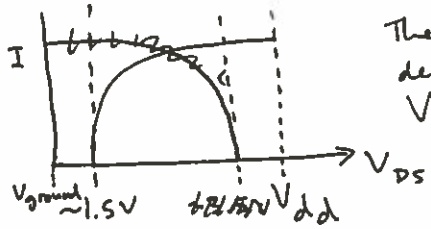




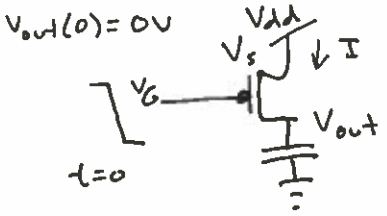
note my absolute sign

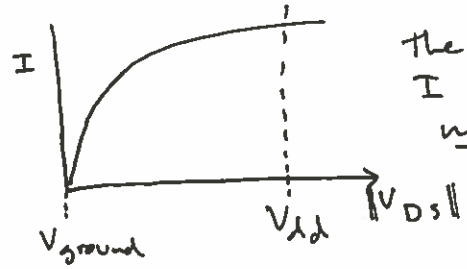
The cap discharges, and as V_{DS} ↓, V_{GD} becomes less negative until the transistor turns off and $I = 0$. The turn-off occurs before $V_G = V_{out}$, thus we get a $V_{out} \approx 1.5$ above ground. I'm not entirely sure why it's ~1.5 V, i'll try to figure that out ASAP. Thus the transistor can't pull down all the way to zero.





The cap charges and as V_{DS} decreases, I ↓ and V_{GS} ↓ until V_{GS} gets too small and the nMOS turns off and $I \to 0$. This occurs about 1.5 V below V_{dd}, thus it is a weak 1





The cap charges and as V_{DS} ↓, I ↓ and V_{GD} becomes more negative, keeping the transistor on until $V_{out} = V_{dd}$. Thus this is a strong 1