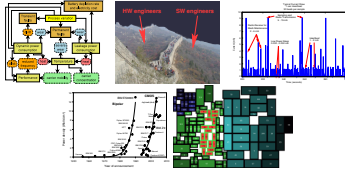


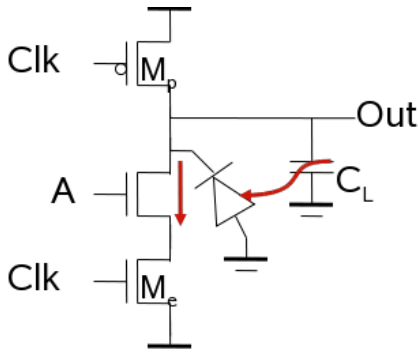
Digital Integrated Circuits – EECS 312

<http://ziyang.eecs.umich.edu/~dickrp/eecs312/>

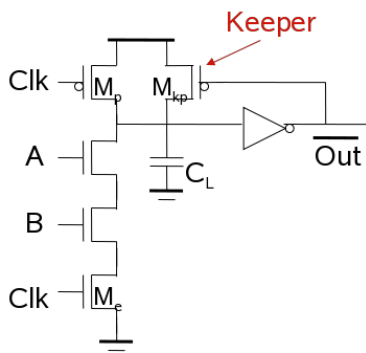
Teacher: Robert Dick GSI: Myung-Chul Kim
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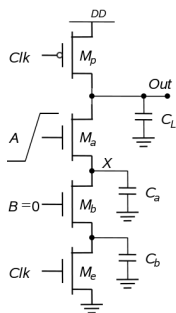
Dynamic logic charge leakage



Leakage prevention



Charge sharing model



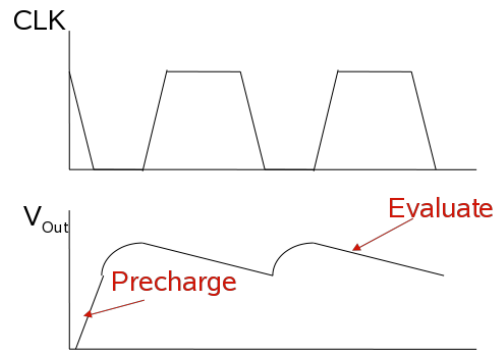
- Determine condition by setting $\Delta V_{out} = V_{Tn}$.
- This yields $\frac{C_a}{C_L} = \frac{V_{Tn}}{V_{DD} - V_{Tn}}$.

Review

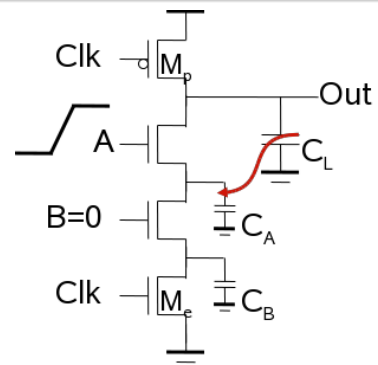
- What are dynamic hazards?
- What are static hazards?
- What problems do hazards cause?
- What is the root cause of static hazards?
- Let's implement a function using DCVSL.

Derive and explain.

Dynamic logic charge leakage timing diagram



Charge sharing



Charge sharing equations

$$\Delta V_{out} = \begin{cases} V_{out}^{(final)} + V_{DD} = -C_a/C_L (V_{DD} - V_{Tn}^{(Vx)}) & \text{if } \Delta V_{out} < V_{Tn} \\ -V_{DD} \frac{C_a}{C_a + C_L} & \text{if } \Delta V_{out} > V_{Tn} \end{cases}$$

Note: The book has a sign error when deriving the boundary point.

