



Dynamic Circuits Additional Slides

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Vishal Saxena | CMOS Inverter

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■ Two modes: *precharge* and *evaluate*





Use series evaluation transistor to prevent fight





- What if pulldown network is ON during precharge?
- Use series evaluation transistor to prevent fight.















- But dynamic gates produce monotonically falling outputs during evaluation
- Illegal for one dynamic gate to drive another!







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$\prod_{i=1}^{M}$ Domino Summary



- 1.3 2x faster than static CMOS
- But many challenges:
 - Monotonicity, leakage, charge sharing, noise
- Widely used in high-performance microprocessors in 1990s when speed was important
- Largely displaced by static CMOS now that power is the limiter
- Still used in memories for area efficiency





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N. Weste and D. Harris, CMOS VLSI Design: A circuits and systems perspective, 4th Ed., Addison-Wesley, 2010.