

RUTGERS UNIVERSITY
Department of Electrical and Computer Engineering
14:332:479 Introduction to VLSI Design
Assignment V
Assigned: October 24, 2007
Due November 5, 2007

Reading Assignment: Chapter 6 of Weste and Harris.

No collaboration is permitted on this assignment. Your work must be your own. You must turn in these specific items for each question to receive credit:

- Cadence logic schematic.
- Cadence Verilog logic simulation.
- Cadence switch-level schematic.
- Cadence Spectre switch-level simulation.
- Cadence layout.
- Cadence Spectre mode simulation for the extracted layout.

1. (**Dynamic Domino CMOS Logic Design.**) Implement the Boolean function

$$H = (A + (\overline{B} \cdot C \cdot E) + (F \cdot G)) \quad (1)$$

in CMOS dynamic n -Domino logic with a keeper (see the schematic in Figure 6.33). Assume that when the clock ϕ is low, the logic output is precharging to logic 1 and when ϕ is high, the logic output is evaluating (this is done by the n -tree). ϕ is the only clock signal you will need. Keep in mind that the precharger is an p -FET and the evaluator is an n -block. Watch out for logic errors! Include an output inverter in this design, include a footer, and include a keeper. Turn in all of the things asked for at the start of this assignment. Would this gate be faster if it were implemented in p -Domino logic with a keeper? If so, why? If not, why not?

2. (**Clocked Dynamic CMOS Logic.**) Implement the Boolean function

$$J = \overline{(A \cdot B \cdot C) + \overline{D} + \overline{E} \cdot (F + G)} \quad (2)$$

as dynamic clocked CMOS logic C²MOS. Turn in all of the things asked for at the start of this assignment.