

RUTGERS UNIVERSITY
Department of Electrical and Computer Engineering
14:332:479 Introduction to VLSI Design
Assignment IX
Assigned: December 3, 2007
Due December 10, 2007

Reading Assignment: Review Chapter 4 in Weste and Harris.

No collaboration is permitted on this assignment. Your work must be your own.

1. (**Elmore Delay.**) Find the worst-case Elmore parasitic delay of an n -input NAND gate.
2. (**Logical Effort.**) Design a circuit at the gate level to compute the following function:

$$\begin{aligned} & \textit{if } (a == b) y = a \cdot c ; \\ & \textit{else } y = 0 ; \end{aligned}$$

Let a , b , c , and y be 16-bit busses. Assume the input and output capacitances are each 10 units. Your goal is to make the circuit as fast as possible. Estimate the delay in FO4 inverter delays using Logical Effort if the best gate sizes were used. What sizes do you need to use to achieve this delay?