

UNC Charlotte, Department of Electrical and Computer Engineering
ECGR 2181, Fall 2009, Homework #7
Due: 10/23/09 at 9:00 AM, the beginning of recitation (100 points)

Show all of your work!!!!

1. How long did this assignment take you? (Answer truthfully!) (5 points)
2. Create a 2-bit binary Half Adder from gates (not from 1-bit adders). It must be able to add x_1x_0 to y_1y_0 to produce C_o and s_1s_0 . Capture the function as a truth table (4 inputs and 3 outputs). Convert each output's equation to use the minimal number of gates. Finally, create the circuit. (45 points)

$$\begin{array}{r} x_1x_0 \\ + y_1y_0 \\ \hline C_o s_1s_0 \end{array}$$

3. Create a 32-Bit Carry-Ripple Adder from 4-bit adders. Assume the 4-bit adders are constructed from Full Adders. What is the longest delay before a valid 32-bit result is ready (in terms of Full Adder Delays)? (30 points)
4. Create a 4-Bit Comparator which Outputs 1 if $A \geq B$. (10 points)
5. Create a 4-Bit Comparator which Outputs 1 if A and B are both negative 2's Complement Numbers. (10 points)