UNC Charlotte, Department of Electrical and Computer Engineering
ECGR 2181, Fall 2008, Homework #5
Due: 10/27/2008, at the beginning of class (100 points)

Show all of your work!!!!!

1. How long did this assignment take you? (Answer truthfully!) (5 points)
2. Consider the ripple carry adders we have discussed in class, but assume they are built with simple logic gates. Write an algebraic expression for s_3, the fourth sum bit of a binary adders, as a function of inputs x_0, x_1, x_2, x_3, y_0, y_1, y_2, and y_3. Assume that $c_0 = 0$, and do not attempt to multiply out or minimize the expression. (Hint: write down expressions for c_1, c_2, and c_3 first.) (50 points)
3. Consider the model of a 4-bit comparator show in our notes, page 19, figure b. Design the additional circuitry inside the comparator (similar to the notes page 26) that will generate five more output signals: (45 points)
   a) zero = 1 when both inputs are zero, 0 when either is non-zero
   b) gt-eq = 1 when A is greater than or equal to B
   c) lt-eq = 1 when A is less than or equal to B
   d) neg = 1 when both A and B are negative twos-complement numbers
   e) inv = 1 when A is the bit-wise inverse of B (i.e. A=0000 and B=1111 would result in inv=1).