Homework #1

due: Thursday, February 3, 2011

- Write your name at the top of each page of your solutions.
- Clearly indicate the start of the solution for each problem.
- Properly order and staple all pages of your solution.
- Show all of your work!
- A solution that requires physical units is incorrect without them.
- Clearly identify your result (e.g. box or circle the result).
- Always write neatly! If it cannot be read, it will not be graded!

- Always read the associated sections of the textbook before attempting the homework problems!

Additional note for this assignment:

Please draw all circuit and wiring diagrams neatly. If the TA cannot read and/or understand your diagram(s) you will not get credit.

1. For the XOR operation:
   
   (a) Specify the truth table.
   (b) Draw the logic symbol.
   (c) Identify the standard logic gate that performs this operation.
   (d) Draw the pin-out for this standard logic gate.
   (e) What is the difference between this operation and the OR operation?

2. For the Equivalence operation:
   
   (a) Specify the truth table.
   (b) Draw the logic symbol.
   (c) Draw the alternate logic symbol.
   (d) What is the other common name for this logic operation?
   (e) Identify the standard logic gate that performs this operation.
   (f) Draw the pin-out of this standard logic gate.
   (g) How is this operation related to the XOR operation?
3. Draw the circuit diagram for the following logic function (i.e. Boolean expression)

\[ F(A,B,C) = A'.B.C + A.B.C' + A'.B'.C \]

*Note: use only 3 inverters in your diagram.*

4. Draw the circuit diagram for the following logic function

\[ F(A,B,C) = (A + B' + C ').(A' + B' + C).(A' + B + C ') \]

*Note: use only 3 inverters in your diagram.*

5. For the following circuit diagram

(a) Derive the logic function (i.e. Boolean expression)
(b) Draw the wiring diagram

*Note: when drawing the wiring diagram, use the template provided on the class webpage.*
6. For the following circuit diagram

(a) Derive the logic function
(b) Draw the wiring diagram

*Note: when drawing the wiring diagram, use the template provided on the class webpage.*