## EE 231 – Homework 2
Due September 9, 2009

1. Convert the decimal numbers $+37$ and $+17$ to 8-bit hexadecimal numbers, unsing the signed 2's complement representation. Then perform the following operations: (a) $(+37) + (-17)$, (b) $(-37) + (+17)$, (c) $(-37) + (-17)$. Convert the answers back to decimal and verify that they are correct.

2. Convert the following binary numbers to ASCII code:
   1001000 1100101 1101100 1101100 1101111 0101100 0100000 1110111
   1101111 1110010 1101100 1100100 0100001

3. By means of a timing diagram similar to Figure 1.5, show the signals of the outputs f and g in the figure below as functions of the two inputs a and b. Use all four possible combinations of a and b.
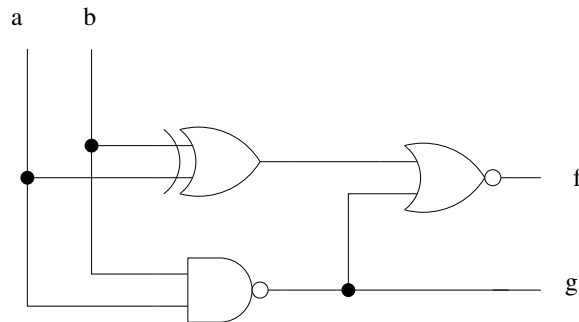
4. Problem 2.1 (a) (b)

5. Simplify the following Boolean expressions to a minumum number of literals

   (a) $x'y' + x'y$

   (b) $xyz + yz' + x'yz$

   (c) $(x + y)'(x' + y')'$

   (d) $(x + y' + z')(x' + z')'$

6. Draw logic diagrams of the circuits that implement the original and simplified expressions in Problem 5 (c) and (d)

7. Find the complements of the following expressions:

   (a) $x'y' + xy$

   (b) $(AB + C'D)E + E'$

   (c) $(x + y' + z)(x' + y)(x + z)$