EE 231 – Homework 3
Due September 16, 2009

1. Find the truth table for the following functions:
   (a) $F = x'y' + x'y + y'z$
   (b) $F = xz + y'z'$
2. Implement the Boolean function
$$F = xy + x'y' + yz'$$
   (a) with AND, OR and inverter gates,
   (b) with NAND and inverter gates,
   (c) with NOR and inverter gates.
3. Problem 2.15
4. Obtain the truth table of the following functions, and express each function as a sum-of-minterms and a product-of-maxterms:
   (a) $(x' + y)(y + z')$
   (b) $(x'y' + y'z + xz')(x' + z')$
5. Problem 2.19
6. Convert each of the following to the other canonical form:
   (a) $F(x, y, z) = \Sigma(3, 5, 6)$
   (b) $F(A, B, C, D) = \Pi(0, 1, 3, 8, 9, 11)$
7. Problem 2.22
8. Simplify the following Boolean functions using three-variable maps:
   (a) $F(x, y, z) = \Sigma(0, 1, 3, 7)$
   (b) $F(x, y, z) = \Sigma(0, 1, 2, 4, 5)$
   (c) $F(x, y, z) = \Sigma(2, 3, 4, 5)$
9. Simplify the followin Boolean expressions using three-variable maps:
   (a) $F(x, y, z) = x'y' + xyz + xy'z$
   (b) $F(x, y, z) = xy + y'z' + xy'z$
   (c) $F(x, y, z) = xy' + y'z + yz$
   (d) $F(x, y, z) = xyz + x'y'z' + x'yz$
10. Simplify the following Boolean functions, using Karnaugh maps:
   (a) $F(x, y, z) = \Sigma(1, 3, 5, 7)$
   (b) $F(w, x, y, z) = \Sigma(7, 12, 14, 15)$
   (c) $F(A, B, C, D) = \Sigma(1, 5, 9, 12, 13, 15)$
   (d) $F(w, x, y, z) = \Sigma(0, 1, 5, 8, 9, 13)$
   (e) $F(w, x, y, z) = \Sigma(0, 1, 2, 3, 5, 9)$