Initial Stuff and Basics
Assigned Date: Third Week
Due Date: Sep. 16, 2013

P1. (10 points) Problem 2.10 in the textbook.

P2. (10 points) Problem 2.11 in the textbook.

P3. (10 points) Problem 2.20 in the textbook. Show all steps.

P4. (10 points) Draw a circuit diagram for the function in P3 using NAND gates only.

P5. (10 points) Consider two functions S and C of three input variables X, Y, and Z. S is logic 1 if and only if the number of input variables equal to 1 is odd (the sum is one or three). Otherwise it is logic 0. C is logic 1 if and only if the number of input variables equal to 1 is two or more. Otherwise it is logic 0. Write the truth tables for the functions S and C. This is called a 3-bit adder.

P6. (10 points). Write the functions S and C from P5 in short hand notation using (a) min terms and (b) max terms. Also write functions S and C in canonical sum-of--products (SOP) and canonical product-of-sums (POS) forms.

P7. (10 points) Simplify the expressions for the functions S and C in problem P6 and draw their respective circuit diagrams.

P8. (10 points) Let L(A,B,C,D) be a four-way light control with four switches A,B,C, and D.
(a) Write the truth table for the function L.
(b) Write the canonical sum-of-products expression for the function L.
(c) Write the canonical product-of-sums expression for the function L.

P9. (10 points) Show how to implement a NOT function using: (a) 2-input NAND, (b) two input NOR, and (c) a two input multiplexer.

P10. (10 points) By applying DeMorgan's Theorem directly to the following circuit, convert it into one that uses only:
(a) NAND gates and NOT gates.
(b) NOR gates and NOT gates.