UNC Charlotte, Department of Electrical and Computer Engineering
ECGR 2181, Fall 2009, Homework #2
Due: Section 002: 9/8/2009; Section 001: 9/9/2009, at the beginning of class (100 points)

Show all of your work!!!!!

1. Convert the decimal number 10000 to a 16-bit two's complement binary number using either of the methods shown in class.
2. Sign extend the result from problem 1 so that it is a 32-bit two's complement binary number.
3. Represent the result from problem 2 in hexadecimal.
4. Convert the decimal number -20000 to a 16-bit two's complement binary number using either of the methods shown in class.
5. Sign extend the result in problem 4 so that it is a 32-bit two's complement binary number.
6. Represent the result from problem 5 in hexadecimal.
7. Show, using 16-bit two's complement binary numbers, the mathematical operation of two decimal numbers (-93 – 114).
8. A popular microprocessor from the late 1970's, the Motorola 68000, is reported to have 68000 transistors. How big would the microprocessor be if the chip used vacuum tubes instead of transistors, assuming a vacuum tube has a volume of 3 cubic centimeters? Express your answer in cubic meters.
9. Assume a logical function f = (a AND b) OR (c AND d). Write the truth table showing all 16 different combinations of a, b, c, and d.
10. Assume a logical function f = ((NOT a) OR (NOT b)) AND ((NOT c) AND (NOT d)). Write the truth table showing all 16 different combinations of a, b, c, and d.