CSE 241 Digital Systems Homework 1 (Updated) Due: Wed, June 15, 2016, 2:00pm
(No late submissions accepted)

1. Convert the decimal number to Binary and Hexadecmal values a. 529 b. 24.275
2. Express the following numbers in decimal a. $(1010.11)_b$ b. $(9ABC.A)_{16}$
3. Perform subtraction by 2's complementing the subtrahend and adding. Assume the numbers to be of 8 bits
   a. $(1000\ 1101)_b$ - $(1\ 0010)_b$ b. $(1\ 0010)_b$ - $(1000\ 1101)_b$
4. Write the expression "SOS 16" in ASCII, using an eight-bit code. Include the space. Treat the left most bit of each character as a parity bit. Each 8-bit code should have even parity.
5. Problem 1.30 from Text (given below)

   The following is a string of ASCII characters whose bit patterns have been converted into hexadecimal for compactness: 73 F4 E5 76 E5 4A EF 62 73. Of the eight bits in each pair of digits, the leftmost is a parity bit. The remaining bits are the ASCII code.
   (a) Convert the string to bit form and decode the ASCII.
   (b) Determine the parity used: odd or even?
6. Minimize the following Boolean expression to minimum number of literals
   a. (x+y+z')(x'y+z) b. w'xy + wxy' + wxy + w'xy'
7. (Text 2.12) We can perform logical operations on strings of bits by considering each pair of corresponding bits separately (called bitwise operation). Given two sixteen-bit strings $A = (F00F)_{16}$ and $B = (F0)_{16}$, evaluate the sixteen-bit result after the following logical operations:

   (a) *A* AND *B* (b) *A* OR *B* (c) A XOR B (d) NOT *A* (e) NOT *B*
8. (Textbook 2.17d) Obtain the truth table of the following function, and express the function in sum-of-minterms and product-of-maxterms form:
   bd' + *acd*' + *ab*'*c* + *a*'*c*'
9. (Text 2.21) Convert each of the following to the other canonical form:
   (a) F(x, y, z) = Σ(1, 3, 5) (b) F(A, B, C, D) = Π(3, 5, 8, 11)
10. Complement the following function using DeMorgan's theorem.
    f = ((A+B'C)'C+ AB'C + A')'