



# EECE256 Assignment 1

1. Convert the following binary numbers in decimal: 101110; 1110101; and 110110100.
2. Convert the following decimal numbers to the bases indicated.
  - a. 7562 to octal
  - b. 1938 to hexadecimal
  - c. 175 to binary
3. Show the value of all bits of a 12-bit register that hold the number equivalent to decimal 215 in (a) binary; (b) octal; (c) hexadecimal; (d) binary-coded decimal (BCD).
4. Show the following operations using 2s complement:
  - a.  $10000111 - 1011001$
  - b.  $1011001 - 10000111$
  - c.  $0.1001 - 0.0101$
  - d.  $0.0101 - 0.1001$
5. Determine by means of a truth table the validity of DeMorgan's theorem for three variables:  $(ABC)' = A' + B' + C'$ .
6. Simplify the following expressions using Boolean algebra.
  - a.  $AB + A(CD + CD')$
  - b.  $(BC' + A'D)(AB' + CD')$
7. Given the Boolean expression  $F = x'y + xyz'$ :
  - a. Derive an algebraic expression for the complement  $F'$ .
  - b. Show that  $F \cdot F' = 0$ .
8. Prove that a 3 input NAND gate is not the same as a simple cascade of two, 2-input NAND gates. Hint: question 4 can help.
9. All the \* questions in Chapter 1.