



# EECE 256 Assignment 2

1. Simplify the following Boolean functions, using 3-variable maps:
  - a.  $F(x,y,z) = \Sigma(0,2,6,7)$
  - b.  $F(A,B,C) = \Sigma(0,2,3,4,6)$
2. Simplify the following Boolean functions, using 4-variable maps:
  - a.  $w'z + xz + x'y + wx'z$
  - b.  $wxy + yz + xy'z + x'y$
3. Simplify the following Boolean function  $F$ , together with the don't-care conditions  $d$ , and then express the simplified function in sum of minterms:
  - a.  $F(x,y,z) = \Sigma(0,1,2,4,5)$ ,  $d(x,y,z) = \Sigma(3,6,7)$
  - b.  $F(A,B,C,D) = \Sigma(1,3,5,7,9,15)$ ,  $d(A,B,C,D) = \Sigma(4,6,12,13)$
4. Given the Boolean function  $F = xy'z + x'y'z + xyz$ 
  - a. List the truth table
  - b. Draw the logic diagram of the original function using 2-input gates
  - c. Simplify the function using Boolean algebra
  - d. List the truth table of the simplified function
  - e. Draw the logic diagram of the simplified function (using 2-input gates)
  - f. Draw the logic diagram of the simplified function using only 2-input NAND gates
5. Implement the following Boolean function together with the don't-care conditions  $d$ , using no more than three NOR gates:
$$F(A,B,C,D) = \Sigma(0,1,9,11)$$
$$d(A,B,C,D) = \Sigma(2,8,10,14,15)$$
6. Derive the circuits for a three-bit parity generator and four-bit parity checker using odd parity bit.
7. The \* problems in Chapter 2
8. The \* problems in Chapter 3 except for 3.35