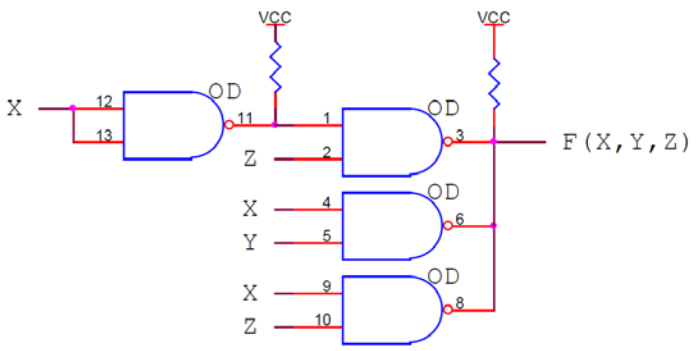
ISTM 214 Homework 6 (Due day: 11/21)

Name:_____ ID:_____

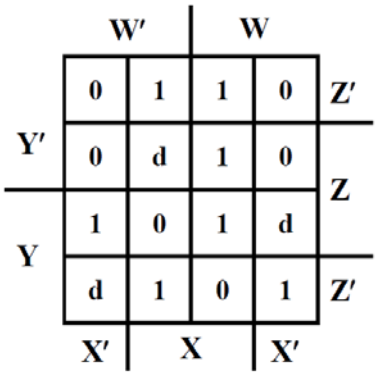
1. Simplify the following Boolean functions to (1) sum-of-products and (2) products-of-sums
   (a) F (A, B, C, D) = Σ(3, 7, 11, 13, 14, 15)
   (b) F (A, B, C, D) = Π (1, 3, 5, 7, 13, 15)

2. Simplify the following Boolean function F, together with the don't-care conditions d ,and then express the simplified function in sum-of-products form:
   (a) F (A, B, C, D) = Σ(0, 6, 8, 13, 14), d(A, B, C, D) = Σ(2, 4, 10)
   (b) F (A, B, C, D) = Σ(5, 6, 7, 12, 14, 15), d(A, B, C, D) = Σ(3, 9, 11)

3. Given the following circuit, determine the ON set of F(X,Y,Z).



4. Simplify the function mapped below in terms of XOR or XNOR operators, draw a circuit realization, and compare the cost of this "simplified" version with minimal SoP (NAND-NAND) and PoS (NOR-NOR) realizations.



5. Assuming the availability of both true and complemented variables, find the simplest (lowest cost) realization of the function mapped below. Solution can be two-level NAND, two-level NOR, or a "mixed" simplification that utilizes XOR/XNOR gates. Justify your choice based on a cost comparison among all potential options. Show the circuit for your final answer.