

ENGR-354 Digital Logic  
HW #3  
Due Thursday 10/8/15

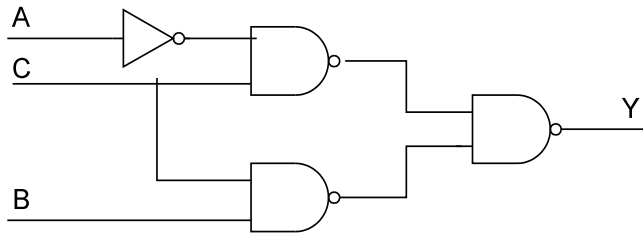
Reading: If you have not read sections 2.6, 2.7, and 2.8 do so. We are skipping sections 2.9,2.10 We are also skipping chapter 3 for now but will pick up selected parts of it in the future. Read section 4.1.

1) Reduce the following expressions to their simplest form. Name the Boolean laws used

a)  $\bar{A} + ABC\bar{C} + (\bar{A} + \bar{C})$

b)  $\overline{A + AC + B}$

2) Create a truth table for the following circuit showing the output Y for all combinations of inputs A, B, C

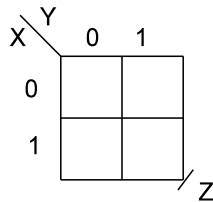


3) Write the minimum sum-of-products function for output Y in problem 2 above:

4) Given the shorthand notation for this function:  $f(a,b,c,d) = \sum m(1,3,6,12,15)$  write out the canonical SOP expression for the function.

5) Place this function into a second order K-map as shown below:

$Z = X\bar{Y} + \bar{X}Y$



6) On page 43 of the text the *cost* of a circuit is defined. What is the *cost* of the circuit in problem 2 above?

7) Recall that each cell of a K-map represents a minterm or maxterm of a function. Write the canonical SOP expression (i.e. no minimization) for the function in this K-map:

