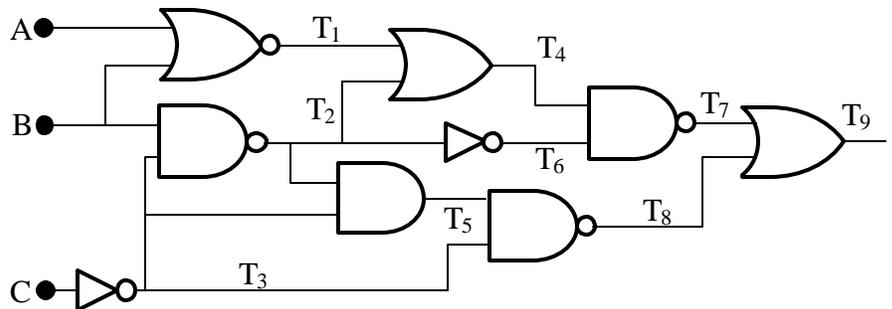


Homework #2

Reading Assignment: Chapters 3-10 through 3-13; 4-1 through 4-5 of *Digital Systems: Principles and Applications*, 10th edition, by Tocci, Widmer & Moss.

- 2-1 Write a Boolean expression for each labeled test point in the circuit shown, in terms of A, B, & C. Simplify your expression for T₉.



- 2-2 Use Boolean algebra to prove the following. Note that for part a), you may *not* use either rule 15a or 15b ($A + \overline{A}B = A + B$).

a. $\overline{A + \overline{A}B} = \overline{A + B}$

d. $A(\overline{A}B)B = 0$

b. $\overline{A\overline{B} + \overline{A}B} = AB + \overline{A}\overline{B}$

e. $A\overline{B} + \overline{A}B + AB = A + B$

c. $\overline{AB + \overline{C}} = \overline{A}C + \overline{A}B\overline{C}$

f. $\overline{A}\overline{B}\overline{C} + \overline{A}B\overline{C} + A\overline{B}\overline{C} + A\overline{B}C = \overline{C}$

- 2-3 Simplify the following expressions:

a. $\overline{\overline{A}BC}$

e. $ABC + A\overline{B}C + \overline{A}$

b. $\overline{A(B + \overline{C})D}$

f. $\overline{RST(R + S + T)}$

c. $\overline{\overline{A + BC}}$

g. $(B + \overline{C})(\overline{B} + C) + \overline{\overline{A + B + C}}$

d. $\overline{\overline{ABCD}}$

h. $AB\overline{C}D + \overline{A}BD + \overline{B} \cdot \overline{C} \cdot D$

- 2-4 Solve the following problem in *Digital Works*. As usual, save it as **abc23-assign01.dwm**, where **abc23** is your Geneseo email name, in my inbox. Also, make sure that your name is in a text box in the circuit itself.

At the Sub Shop, sandwiches are available with up to six toppings: Tomato, Lettuce, Pickles, Vidalia onions, Hot sauce, and Cheese. For insurance purposes, the Sub Shop charges an extra Fee for more dangerous sandwiches. Subs with hot sauce are dangerous unless lettuce is also provided. Even subs with hot sauce and lettuce are dangerous when they also include onions or pickles. Finally, subs with onions and pickles together are safe only when lettuce is also included. Build a circuit for F in terms of inputs T, L, P, V, H and C. All inputs should be listed vertically in the order described here.