

EE 2720, Fall 05

HW # 5

Due Friday Nov. 11, 05 at 12:00
in my office (under my door please).

Friendly note 1: Enjoy the bubbles!! They
are fun!!

Friendly note 2: Have a nice weekend!
Your friend
Alex!!

Homework #5

Problem 1: Consider the logic function F where F is $F = A \cdot B' + C' \cdot D + E'$. Realize F using only NAND gates using the graphical approach (bubbles etc). You must show a figure of course.

Problem 2: Consider the logic function F where F is $F = (A + B') \cdot (C' + D) \cdot E'$. Realize F using only NOR gates using the graphical approach (bubbles etc). You must show a figure of course.

Problem 3: Consider the logic function F where F is $F = A \cdot B' + C' \cdot D + E'$

(a) Realize F using NOT, AND and OR gates. This is of course going to be an AND-OR realization. Call this realization, realization #1.

(b) Realize F using only NAND gates. Do not use the graphical approach this time. Use an algebraic approach instead. Call this realization, realization #2.

(c) Realize F using only OR and NAND gates. Call this realization, realization #3.

(d) Realize F using only NOR and OR gates. Call this realization, realization #4.

(e) Transform realization #3 into realization #4 using the graphical approach (bubbles etc).

(f) Transform realization #4 into realization #3 using the graphical approach (bubbles etc).

Note: You must show figures here in problem 3 of course.

HW#5 Cont.

Problem 4: Consider the logic function F where F is $F = (A+B') \cdot (C+D) \cdot E'$.

- (a) Realize F using NOT, OR and AND gates. This is of course going to be an OR-AND realization. Call this realization realization # 1.
- (b) Realize F using only NOR gates. Do not use the graphical approach this time. Use an algebraic approach instead. Call this realization realization # 2.
- (c) Realize F using only AND and NOR gates. Call this realization realization # 3.
- (d) Realize F using only NAND and AND gates. Call this realization realization # 4.
- (e) Transform realization # 3 into realization # 4 using the graphical approach (bubbles etc).
- (f) Transform realization # 4 into realization # 3 using the graphical approach (bubbles etc).

Note: You must show figures here in problem 4 of course

Problem 5: Consider the logic circuit of figure 1 on next page. It is an AND-OR logic circuit. Transform the circuit of figure 1 into an equivalent OR-AND logic circuit by using the graphical approach (bubbles etc). You must show a figure of course.

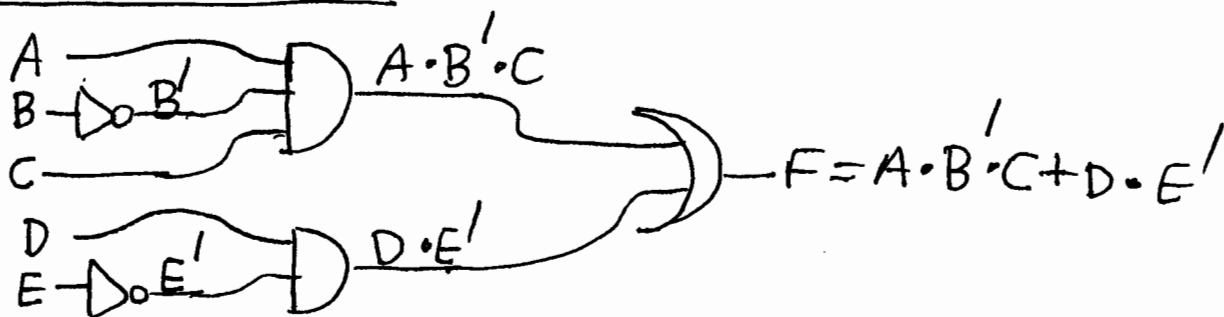
HW#5 Cont.Problem 5 cont:

Figure 1: An AND-OR logic circuit.

Problem 6: Consider the logic circuit of figure 1 below. It is an OR-AND logic circuit. Transform the circuit of figure 1 into an equivalent AND-OR logic circuit by using the graphical approach (bubbles etc). You must show a figure of course.

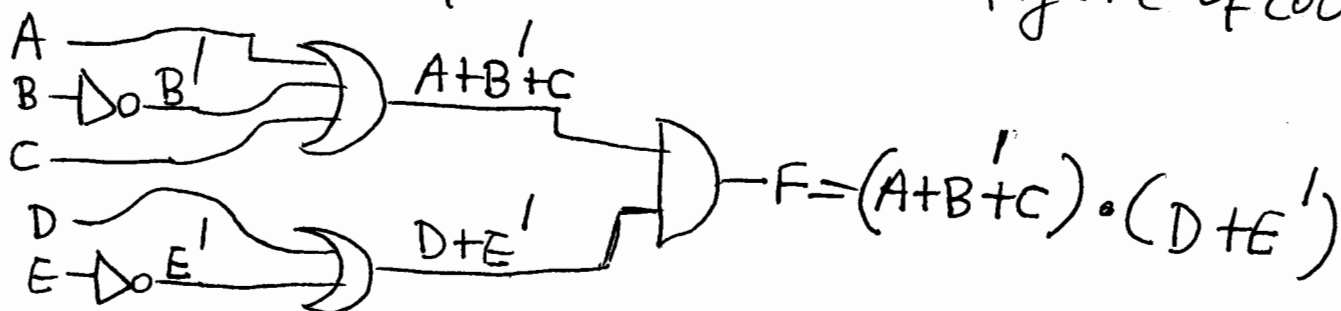


Figure 1: An OR-AND logic circuit.

Problem 7: Prove equations (5), (6), (7), (8) and (11) on page 8 of handout # 11; (they relate to the XOR operator). You are not allowed to use a truth table when proving equation (11).

Your friend

Alex!!

Enjoy your HW; it is fun & easy!