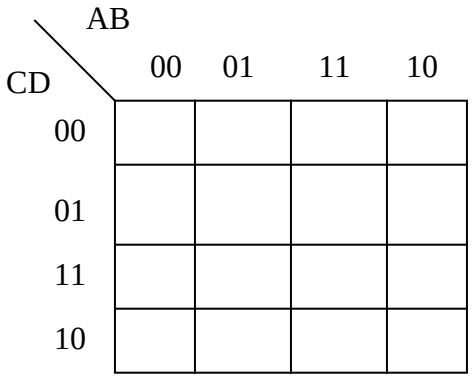
EE 3714 Test #2 - Fall 1999 – Reese

SSN: _____ (no names please)

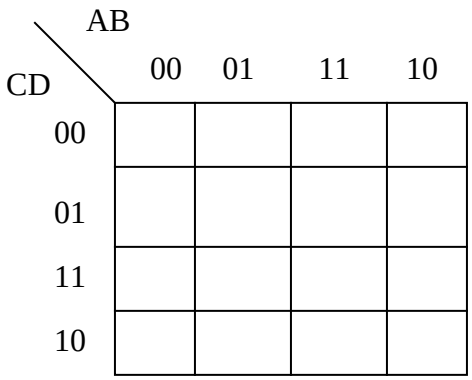
Work all problems.

1. (8 pts) Plot the following function on a K-Map.

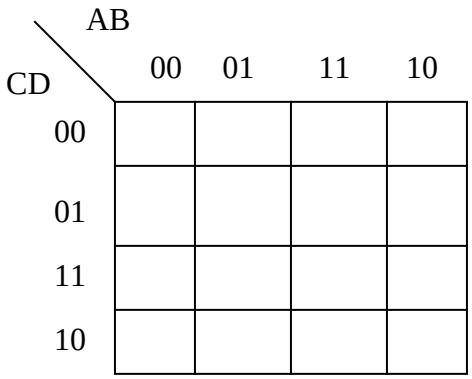
$$F(A,B,C,D) = AD + B\bar{C}$$



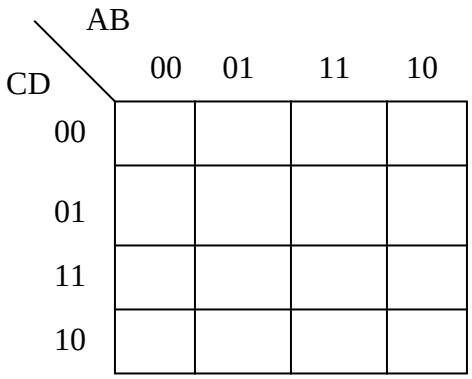
2. (8 pts) Plot the following function on a K-Map.
   $F(A,B,C,D) = \Pi\ M(0,3,4,8,12,13,15)$



3. (8 pts) Simplify the following K-map to get a **minimal** SOP form.



4. (8 pts) Simplify the following K-Map to get a **minimal** POS form.



5. (8 pts) On the diagram below, I want Y to be asserted (LOW TRUE) when both switches are depressed. Draw the Gate(s) that I need. Be sure to list the GATE NUMBERS (i.e. 7400, 7402, etc).

6. (8 pts) On the following map, identify a PRIME IMPLICANT, an ESSENTIAL PRIME IMPLICANT, and a NON-ESSENTIAL Prime Implicant.

CD \ AB	00	01	11	10
00				
01				
11				
10				

7. (10 pts) a. I would like to implement one function F (A,B,C) and one function G(W,X,Y,Z) in the same memory device. Note that the two functions do not share any common variables. What size memory device do I need? (specified as K x M, where K is the number of locations, M is the number of bits per location).

b. . I would like to implement the function F (A,B,C), G(B, C, D), and H(C, D,E) in the same memory device. Note that the three functions share some common variables. What size memory device do I need? (specified as K x M, where K is the number of locations, M is the number of bits per location)

8. (5 pts) On the attached PLD diagram (Figure 1), explain what function is implemented according to the fuse marking.

Y' = ??????

9. (5 pts) Write the following function in SOP form using the minterms indicated. Do NOT minimize.

F(A,B,C,D) = Σ m(3,5,15)

10. (5 pts) Write the following function in POS form using the maxterms indicated. Do NOT minimize.

F(A,B,C,D) = Π M(3,5,15)

11. (15 pts) For the PLD diagram labeled as "Figure 2", answer the following questions:

a. What is the maximum number of logic equations I could implement in this PLD at the same time?

b. What is maximum number of input variables that equation could have?

c. What is the maximum number of product terms each equation could have? (assuming that an output is NOT fed back around to an input).

d. Show how to implement the equation (do NOT attempt to minimize this equation, implement as shown):

Y(A,B,C,D,E,F,G,H) = A'B + ACE' + FG' + D'G'H'

12. Fill in the blanks using terms from the following list:

INEFFICIENT , Volatile, 1, JEDEC, Non-Volatile, 0, VHDL, EFFICIENT, PLD, PRODUCT TERM, Memory, LookUp Table, Intact, Fuse, POS, SOP, Non-Intact

a. When all fuses are intact, the value of a product term in a PAL is _____ .

b. A memory is _____ at implementing wide Boolean functions and multiple functions of independent variables.

c. A _____ File specifies which fuses should be blown or left intact within a PLD.

d. A PLD which must be reconfigured (reprogrammed) on every power up has _____ programming.

e. Another name for a memory is _____ when it is used to implement a combinational function.

f. _____ is a language used for specifying boolean equations which can be mapped to programmable logic.