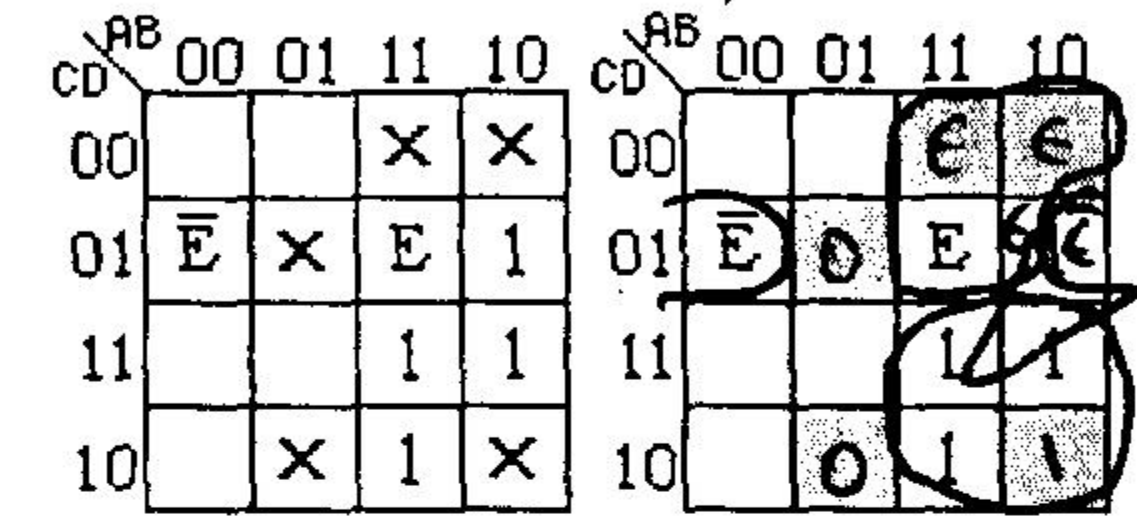Name: Bali George

PHY 233
Quiz I

1. In the Karnaugh map shown the blanks are zeros. Replace the "Don't Cares" with appropriate values, and write down the minimized logic function. Fill in the values of the X's *explicitly* in the blank map given. *(Correctness: 9 pts. Minimalism: 6 pts.)*

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2. Follow the Quine-McCluskey method to minimize the function (F) shown below. Show all your steps clearly. Indicate the redundant group(s). *(Minimized function: 10pts + Redundant groups: 5pts = 15 pts.)*

$$F = m_0 + m_1 + m_5 + m_7 + m_{10} + m_{11} + m_{13} + m_{15}$$

	m_0	m_1	m_5	m_7	m_{10}	m_{11}	m_{13}	m_{15}
000_	X	X						
0_01		X	X					
_1_1			X	X		X	X	X
10_					X	X		
1_1								

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3. Show how the 3 variable Karnaugh Map can be realized using the 2-bit Address Multiplexer given. You can save time answering on this sheet. *(10 pts)*


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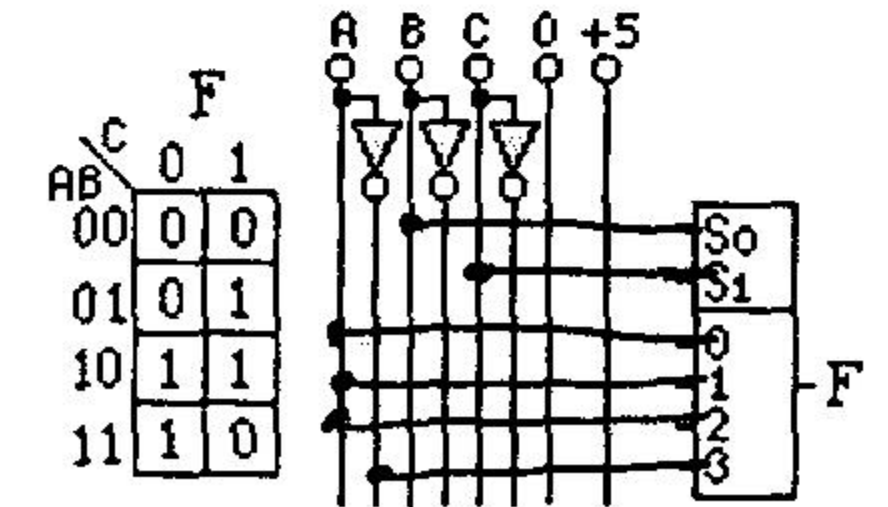
4. Figure shows an 8x4 memory chip. *(12 pts)*
Indicate the values of m1 and m2.
Show how can use it to construct a 16x12 memory " chip".
You must connect I/O and the address to the appropriate buses.
Note: Redraw the figure in your answer booklet.

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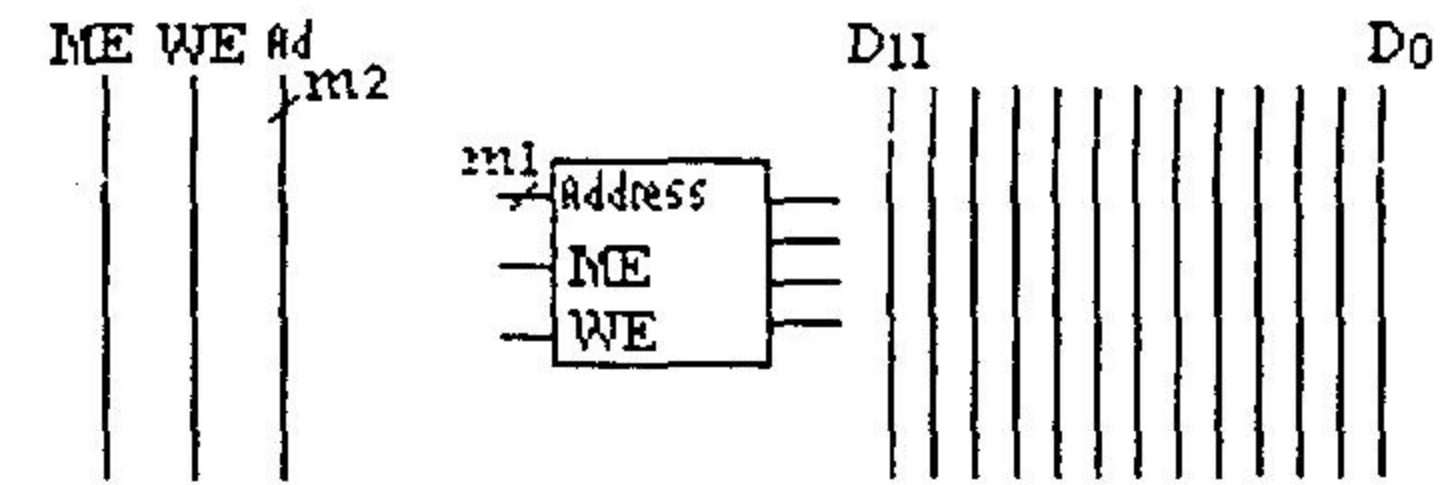
5. Answer 6 of the following 8 questions briefly. The 8th answer will be ignored. *(6x8 = 48)*

   a. Perform the Binary division 101010/110 EXPLICITLY. *(No points for answers like 42/6 = 7)*

   b. State the gate(s) that must be included in the realization of the map to ensure Hazard Cover. Explain your answer briefly. No points for the other gates

   c. When will a counter be suicidal? Explain with the aid of a diagram

   d. Calculate the distance between the two numbers shown by heavy dots.

   e. Draw a Debouncer and describe its function

   f. When will a hazard be **dynamic**?

   g. Draw the circuit of a range detector that tests whether 3 < N < 11 is satisfied.

   h. Calculate the cycles of the counter given.
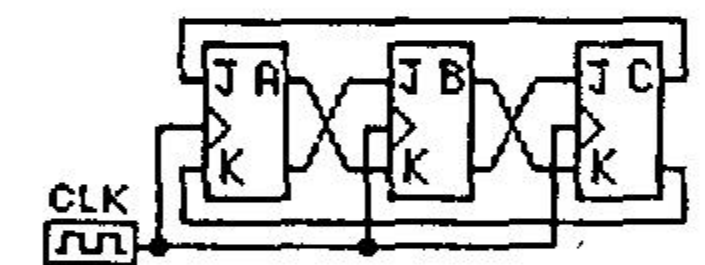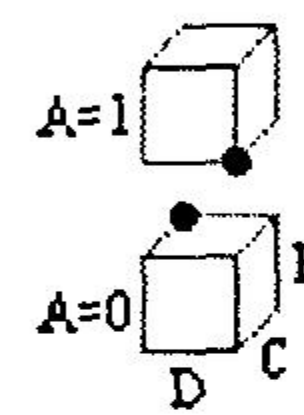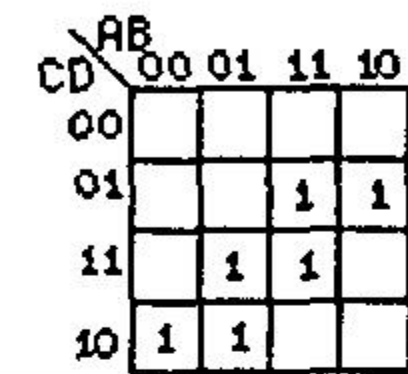
Good Luck! $2x15 + 10 + 12 + 49 = 101$

X Bonus 1 : How can one use the the Quine-McCluskey method when there are "don't cares"?

Bonus 2: Show that if the number of functions of N variables is M, then that of (N+1) variables is M^2.