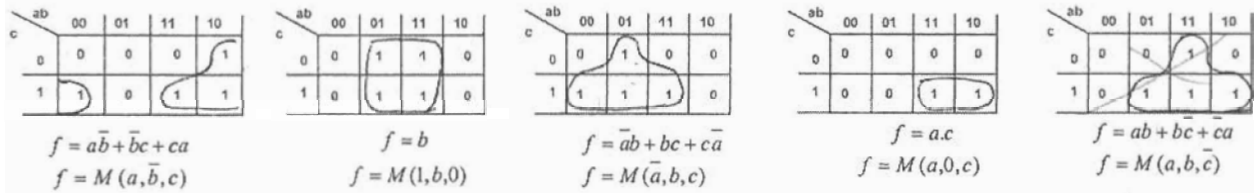


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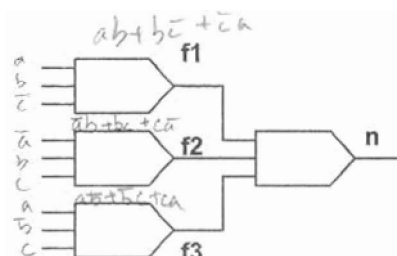
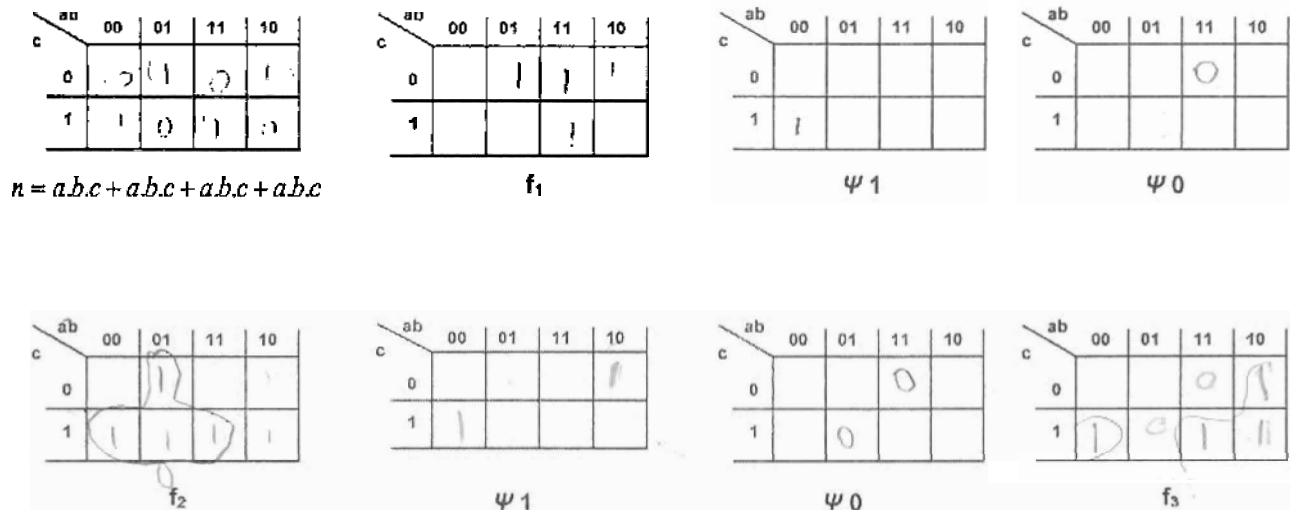
Worksheet 9
EEL 4705

Emerging Logic Devices – K-Map based Mapping
(To convert AND/OR Logic to Majority Logic)



Question 1: Making use of the Algorithm and the K-Maps depicted, reduce the following function into a Majority Logic function. Each of the three functions (f_1, f_2, f_3) will be only from the Library of K-Map patterns depicted above.

- $n = a.b.c + a.b.c + a.b.c + a.b.c$
Function needs to be broken in the form $n = \text{Maj}(f_1, f_2, f_3)$
- Find an admissible pattern for f_1 from the above library.
For finding f_2 , set Ψ_1 is obtained as follows: if a minterm of n is not a minterm of f_1 , add this minterm to Ψ_1 .
- Similarly, for finding f_2 , set Ψ_0 is obtained as follows: if a maxterm of n is not a maxterm of f_1 , add this maxterm to Ψ_0 .
A suitable pattern for f_2 is then determined using new Ψ_1 and Ψ_0 (from the above library).
- Furthermore, to determine f_3 , Ψ_1 and Ψ_0 are updated again as follows: if a minterm (maxterm) of node n is not a minterm (maxterm) of both f_1 and f_2 , add this minterm (maxterm) to Ψ_1 (Ψ_0).



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Question 2: Perform the AND/OR mapping of the same expression $n = a\bar{b}\bar{c} + \bar{a}b\bar{c} + \bar{a}\bar{b}c + a\bar{b}c$. Then see the difference in the number of majority gates used for K-map method and AND/OR method.

