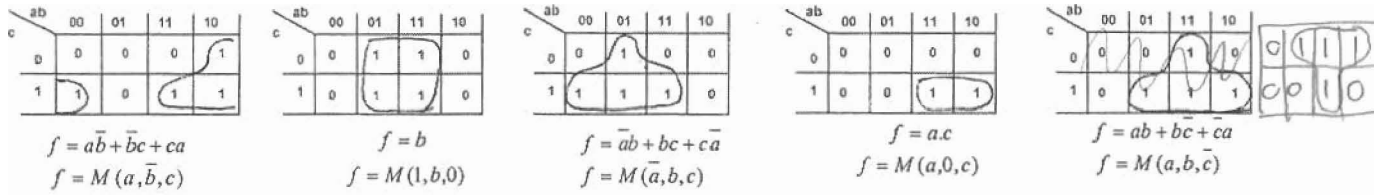




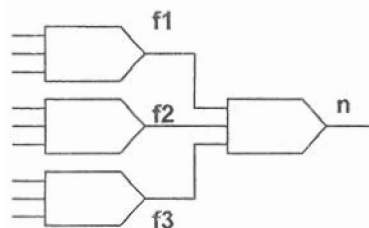
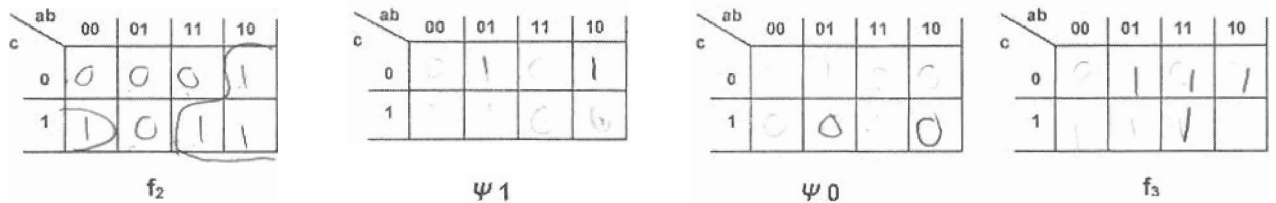
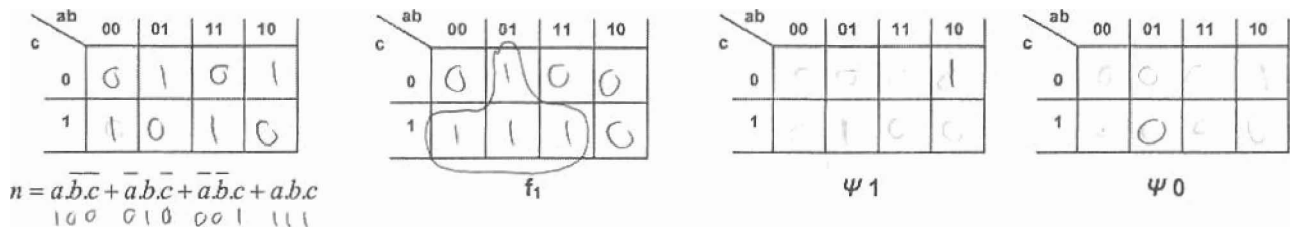
Worksheet 9 EEL 4705

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.

- $n = a\bar{b}\bar{c} + \bar{a}b\bar{c} + \bar{a}\bar{b}c + abc$
 - 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 $n = \overline{a}\overline{b}c + \overline{a}b\overline{c} + a\overline{b}\overline{c} + abc$.
Then see the difference in the number of majority gates used for K-map method and AND/OR method.