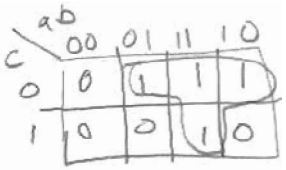
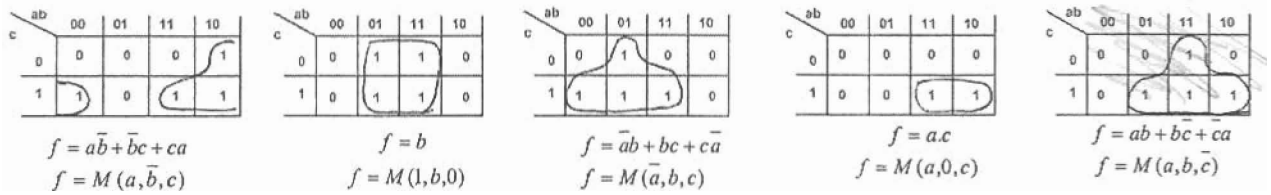
Group No.
UIDs [redacted]

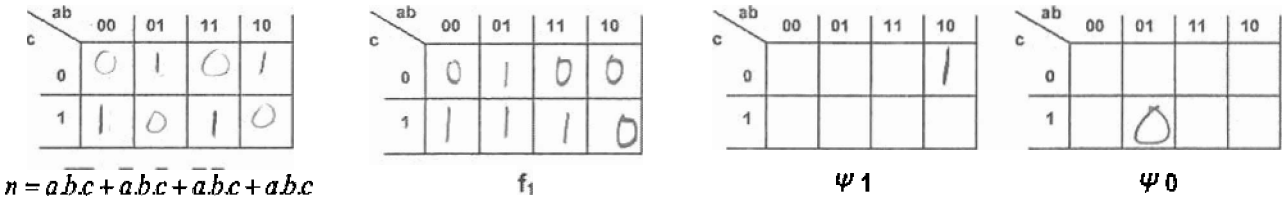
Worksheet 9
EEL 4705
Emerging Logic Devices – K-Map based Mapping
(To convert AND/OR Logic to Majority Logic)

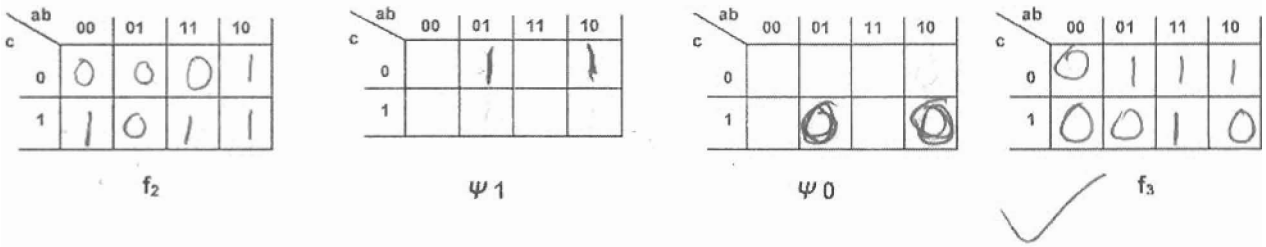


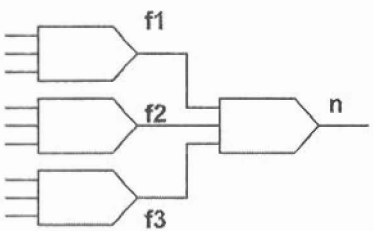


Question 1: Making use of the Algorithm and the K-Maps depicted, reduce the following function into a Majority Logic function. Each of the three functions (f_1,f_2,f_3) will be only from the Library of K-Map patterns depicted above.

- $n = a.\overline{b.c} + \bar{a}.b.\bar{c} + \bar{a}.\bar{b}.c + a.b.c$
- Function needs to be broken in the form n = 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 f1 and f2, add this minterm (maxterm) to Ψ_1 (Ψ_0).







Group No.
UIDs:

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