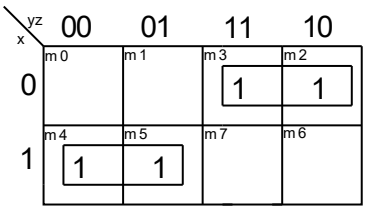
CPE 64 PAL Worksheet ECS, CSUS

K- MAP WORKSHEET

Example1) Simplify the Boolean function F (x, y, z) = $\sum(2,3,4,5)$



1st group on the top row = x'y

2nd group on the bottom row = xy'

F (x, y, z) = $\sum(2,3,4,5)$ = = x'y + xy'

1) Simplify the Boolean functions F (x, y, z) = $\sum(0,2,4,5)$, using three-variable K Map.

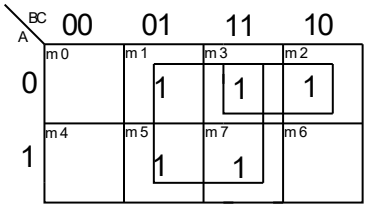
2) Simplify the Boolean functions F (x, y, z) = $\sum(0,1,2,3,5)$, using three-variable K Map.

3) Simplify the above Boolean function of question 2 using Boolean Algebra and compare the results. Also, comment which method is simple.

4) How do we decide the number of cells in the K-Map table for 'n' variables.

Example 2) For the Boolean Function F = A'C + A'B + AB'C + BC

a) Express this function as a sum of min terms.
b) Find the minimal sum-of-products expression.



a) The function can be expressed in sum-of-minterms form as F (A, B, C) = $\sum(1,2,3,5,7)$
b) A'C + A'B + AB'C + BC = C + A'B

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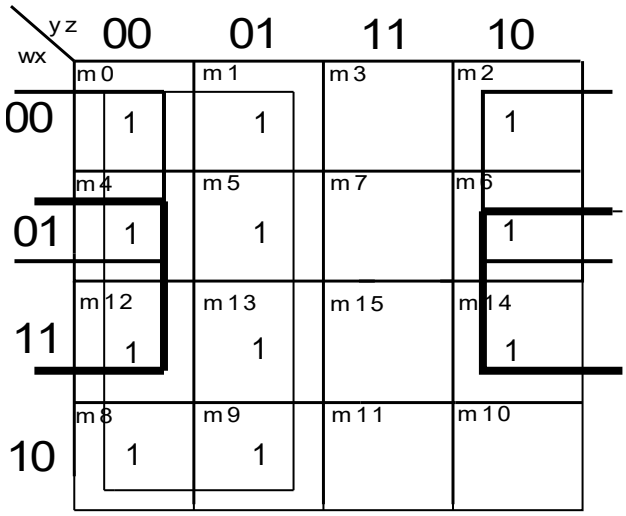
5) Simplify the Boolean functions xy + x' y' z' + x' yz' using three-variable K Map.

6) Express the Boolean functions F (x, y, z) = x'yz + xy'z' + xy'z in sum of min terms form and find the minimal sum-of-products expression.

7) What is a prime implicant in K-Map and why should we combine the maximum number of squares in K-Map?

Example 3) Simplify the Boolean function F (w, x, y, z) = $\sum(0,1,2,4,5,6,8,9,12,13,14)$ using four variable K Map



$F = y' + w'z' + xz'$

8) Simplify the Boolean function F (w,x,y,z) = $\sum(1,3,4,5,6,7,9,11,13,15)$ using four variable K Map.

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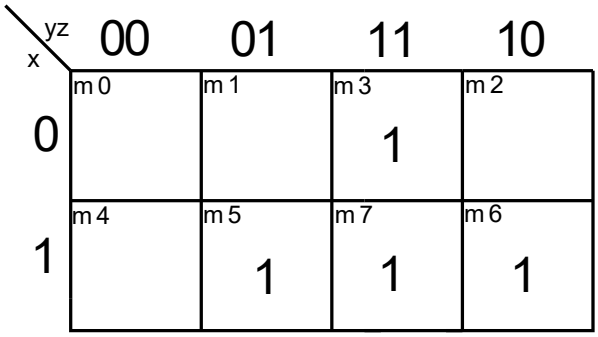
Example 5) Find the min terms of the Boolean expression xy + yz + xy' z by first plotting the function in a map.



$F(x, y, z) = \sum(3,5,6,7)$

$F = x'yz + xyz + xy'z + xyz'$

9) Find the min terms of the Boolean expression wyz + w'x' + wxz' by first plotting the function in a map.

10) Was the K-Map approach for simplifying Boolean expressions simpler in comparison to the alternative simplification methods?