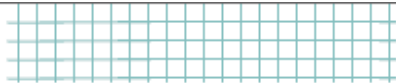


Simplification Of Boolean Functions

Part-III

Feb-9-2014

ASIC's



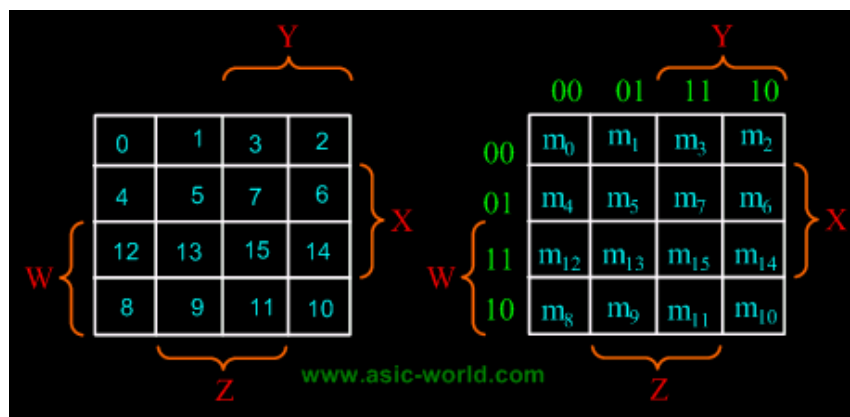
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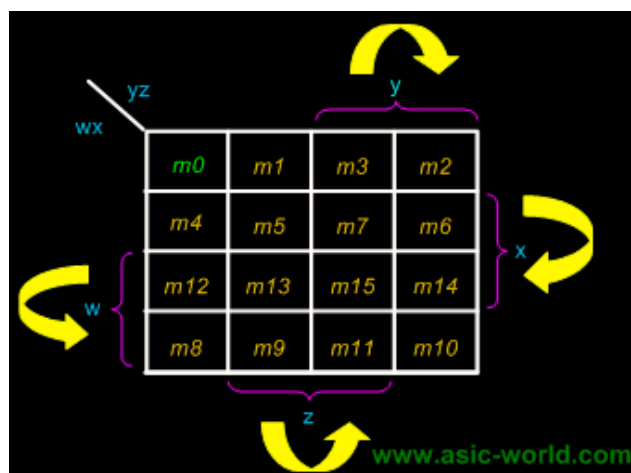


4-Variable K-Map

There are 16 cells in a 4-variable (W, X, Y, Z); K-map as shown in the figure below.

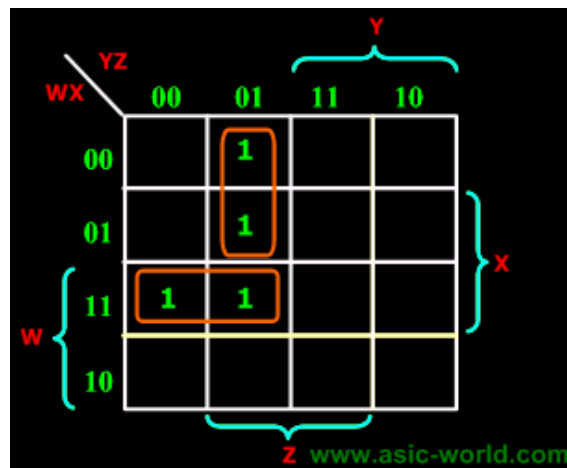


There are 2 wrap-around: a horizontal wrap-around and a vertical wrap-around. Every cell thus has 4 neighbours. For example, the cell corresponding to minterm m₀ has neighbours m₁, m₂, m₄ and m₈.



Example

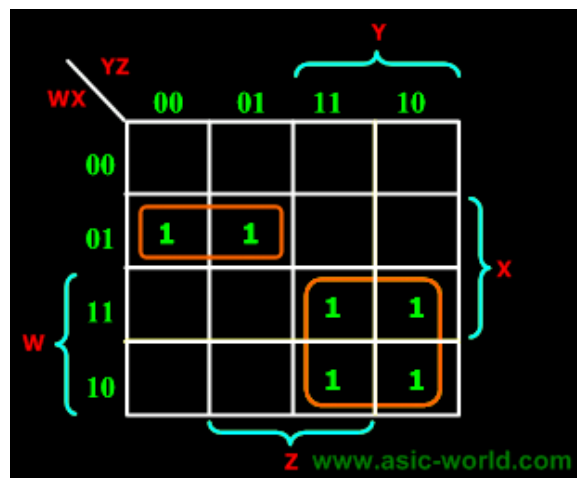
$$F(W,X,Y,Z) = (1,5,12,13)$$



$$F = WY'Z + W'Y'Z$$

✦ Example

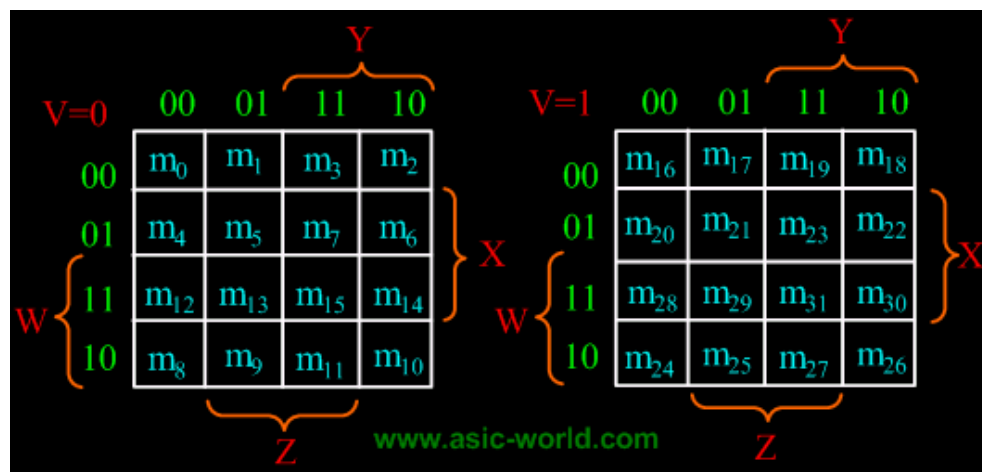
$$F(W,X,Y,Z) = (4, 5, 10, 11, 14, 15)$$



$$F = W'XY' + WY$$

✦ 5-Variable K-Map

There are 32 cells in a 5-variable (V, W, X, Y, Z); K-map as shown in the figure below.



✦ Inverse Function

- The 0's on a K-map indicate when the function is 0.
- We can minimize the inverse function by grouping the 0's (and any suitable don't cares) instead of the 1's.
- This technique leads to an expression which is not logically equivalent to that obtained by grouping the 1's (i.e., the inverse of $X \neq X'$).
- Minimizing for the inverse function may be particularly advantageous if there are many more 0's than 1's on the map.
- We can also apply De Morgan's theorem to obtain a product-of-sum expression.



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Do you have any Comment? mail me at: deepak@asic-world.com