

Consider the following 4-variable function:

$$F(w, x, y, z) = \sum m(0, 2, 4, 5, 9, 10, 11, 13, 15)$$

1. Draw the K-map for the minterms of F :

		yz			
		00	01	11	10
wx	00	1			1
	01	1	1		
	11		1	1	
	10		1	1	1

2. List all the prime implicants from the above K-map and state whether they are essential or non-essential.

Prime Implicants	Essential / Non-essential
1. wz	Essential
2. $\bar{w}\bar{y}\bar{z}$	Non-essential
3. $\bar{w}x\bar{y}$	Non-essential
4. $\bar{w}\bar{x}\bar{z}$	Non-essential
5. $w\bar{x}y$	Non-essential
6. $\bar{x}y\bar{z}$	Non-essential
7. $x\bar{y}z$	Non-essential

3. State below the simplified SOP expression of F using the selection rule:

$F(w, x, y, z) = wz + \bar{w}\bar{x}\bar{z} + \bar{w}x\bar{y} + w\bar{x}y/\bar{x}y\bar{z}$
 Or $F(w, x, y, z) = wz + \bar{w}\bar{y}\bar{z} + \bar{x}y\bar{z} + x\bar{y}z/\bar{w}x\bar{y}$
 Both are okay.

4. [Unrelated to the previous questions] For a function F whose K-map is given below, find the simplified POS expression:

		BC			
		00	01	11	10
A	0	0	0	1	0
	1	0	1	1	0

$C.(A + B)$