# **DIGITAL DESIGN**

CS/ECE/EEE/INSTR F215

Lecture 7 Sarang Dhongdi

## Quine-McCluskey method (QM)

- Suitable for computer solution
- · Uses Tabular method

### QM Method

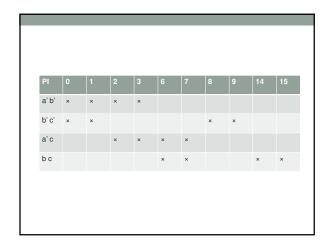
• D = f(a, b, c, d) =  $\Sigma$  (0,1,2,3,6,7,8,9,14,15)

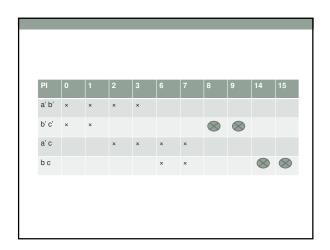
#### $D = f(a, b, c, d) = \Sigma (0,1,2,3,6,7,8,9,14,15)$

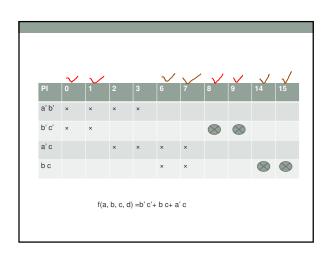
Index	Decimal Number		Binary rep	resentation	1
0	0	0	0	0	0
1	1	0	0	0	1
	2	0	0	1	0
	8	1	0	0	0
2	3	0	0	1	3
	6	0	1	1	0
	9	1	0	0	1
3	7	0	1	1	1
	14	1	- 1	1	0
4	15	1	1	1	1

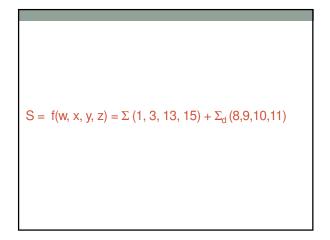
0	0	0	0	0	(0	,1)	0	0	0	-
1	0	0	0	1	(0	,2)	0	0		0
2	0	0	1	0	(0	,8)	-	0	0	0
8	1	0	0	0	(1	,3)	0	0	-	1
3	0	0	1	1	(1	,9)	-	0	0	1
6	0	1	1	0.	(2	,3)	0	0	1	
9	1	0	0	1	(2	,6)	0	-	1	0
7	0	1	1	1	(8	,9)	1	0	0	
14	1	1	1	0	(3	,7)	0	-	1	1
15	1	1	1	1	(6	,7)	0	1	1	-
					(6,	14)	-	1	1	0
					(7,	15)		1	1	1
					(14	,15)	1	1	1	-

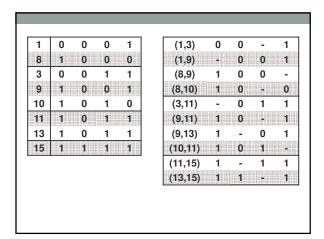
(0,8) - 0 0 0
(0,8) - 0 0 0 (2,3) (6,7,1) (2,3) 0 0 1 - (2,6) 0 - 1 0 (8,9) 1 0 0 -
(1,3) 0 0 - 1 (1,9) - 0 0 1 (2,3) 0 0 1 - (2,6) 0 - 1 0 (8,9) 1 0 0 -
(1,9) - 0 0 1 (2,3) 0 0 1 - (2,6) 0 - 1 0 (8,9) 1 0 0 -
(2,3) 0 0 1 - (2,6) 0 - 1 0 (8,9) 1 0 0 -
(2,6) 0 - 1 0 (8,9) 1 0 0 -
(8,9) 1 0 0 -
(3.7) 0 - 1 1
(-,-,
(6,7) 0 1 1 -
(6,14) - 1 1 0
7,15) - 1 1 1
14,15) 1 1 1 -

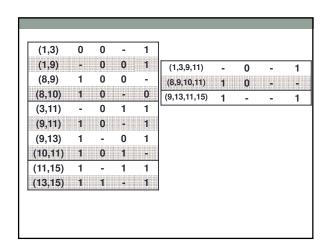


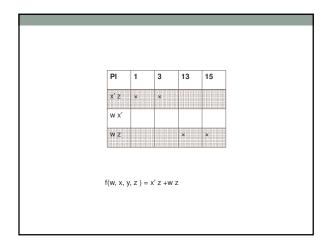


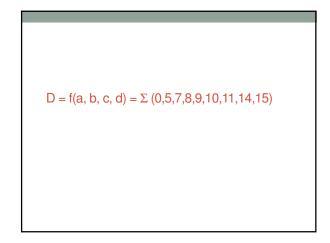


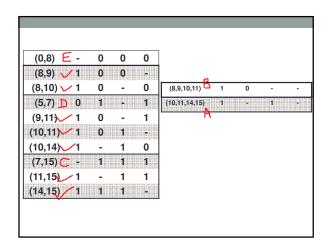


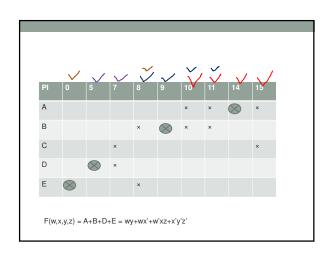




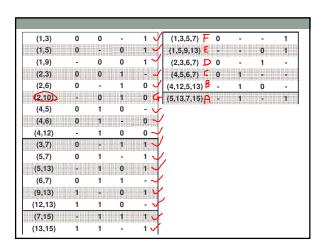


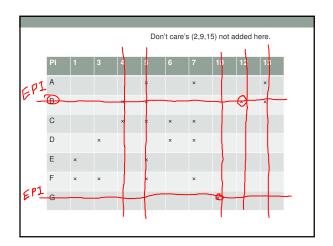


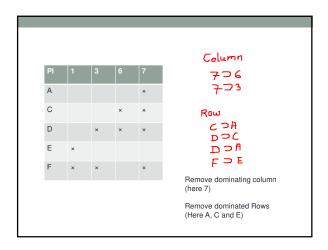


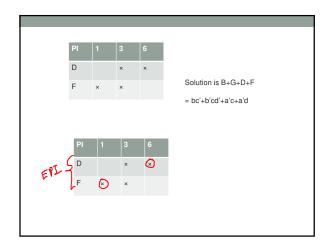


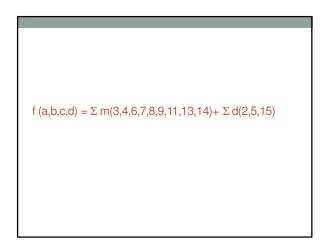
 $f(a,b,c,d) = \sum m(1,3,4,5,6,7,10,12,13) + \sum d(2,9,15)$ 

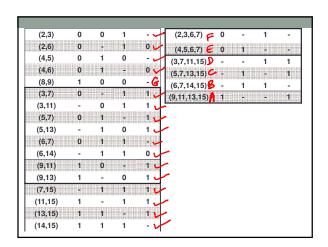


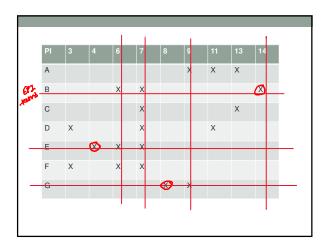


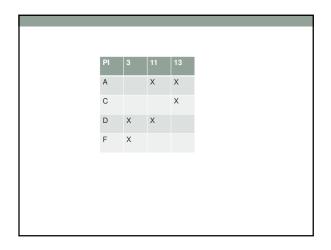


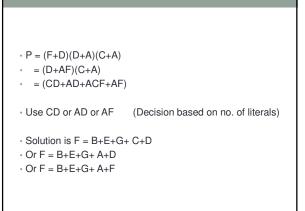






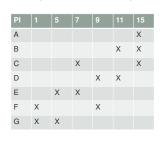






### Various examples of PI table

· Consider following table after removing EPI terms



P = (F+G)(E+G)(C+E)(D+F)(B+D)(A+B+C)

= (G+EF)(D+BF)(C+AE+BE)

= (GD+GBF+DEF+BEF)(C+AE+BE)

• = (CGD+GDAE+GDBE+CGBF+AEGBF+GBFE+CDEF

+ADEF+BDEF+BCEF+ABEF+BEF

Use Either CGD or BEF (Decision based on no. of literals)

• Solution is F = (EPI terms) + C+G+D

• Or F = (EPI terms) + B+E+F