



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai

Accredited by NAAC-UGC with 'A++' Grade (Cycle III) &

Accredited by NBA (B.E - CSE, EEE, ECE, Mech&B.Tech.IT)

COIMBATORE-641 035, TAMIL NADU



## Karnaugh Map Problems:

1)  $Y = f(a,b,c) = \sum_m (0,1,4,5)$

a \ bc	00	01	11	10
0	1	1		
1	1	1		

$$Y = \bar{a}\bar{b}\bar{c} + \bar{a}\bar{b}c + a\bar{b}\bar{c} + a\bar{b}c$$

$$= \bar{a}\bar{b}(\bar{c}+c) + a\bar{b}(\bar{c}+c) \Rightarrow \bar{a}\bar{b} + a\bar{b} \Rightarrow \bar{b}(\bar{a}+a)$$

$$Y = \bar{b}$$

2)  $G = f(a,b,c) = \sum_m (0,2,3,7)$

a \ bc	00	01	11	10
0	1		1	1
1			1	

$$G = \bar{a}bc + abc + \bar{a}\bar{b}\bar{c} + \bar{a}b\bar{c}$$

$$= bc(\bar{a}+a) + \bar{a}\bar{c}(\bar{b}+b)$$

$$G = bc + \bar{a}\bar{c}$$

3)  $Q = f(a,b,c) = \sum_m (1,2,3,6,7)$

a \ bc	00	01	11	10
0		1	1	1
1			1	1

$$Q = b + \bar{a}c$$



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4)  $Y = \sum_m (7, 9, 10, 11, 12, 13, 14, 15)$

	CD	00	01	11	10
AB					
00		0	1	3	2
01		4	5	7	6
11		12	13	15	14
10		8	9	11	10

$Y_1 = AB$

$Y_2 = AD$

$Y_3 = AC$

$Y_4 = BCD$

$Y = Y_1 + Y_2 + Y_3 + Y_4$

$Y = AB + AD + AC + BCD$

5)  $Y = m_1 + m_3 + m_5 + m_7 + m_8 + m_9 + m_{12} + m_{13}$

	CD	00	01	11	10
AB					
00		0	1	3	2
01		4	5	7	6
11		12	13	15	14
10		8	9	11	10

$Y_1 = \bar{C}D$

$Y_2 = A\bar{C}$

$Y_3 = \bar{A}D$

$Y = Y_1 + Y_2 + Y_3$

$Y = \bar{C}D + A\bar{C} + \bar{A}D \Rightarrow \bar{C}(A+D) + \bar{A}D$



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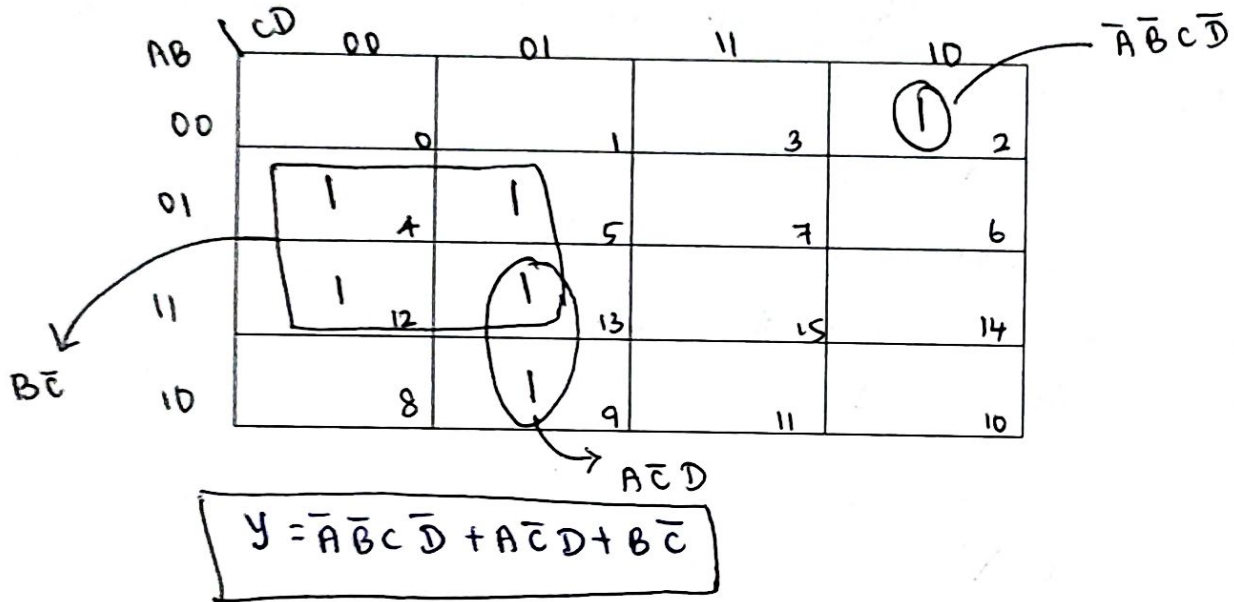
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6) Simplify the Boolean expression:

$$Y = A'BC'D' + A'BC'D + ABC'D' + ABC'D + AB'C'D + A'B'CD'$$

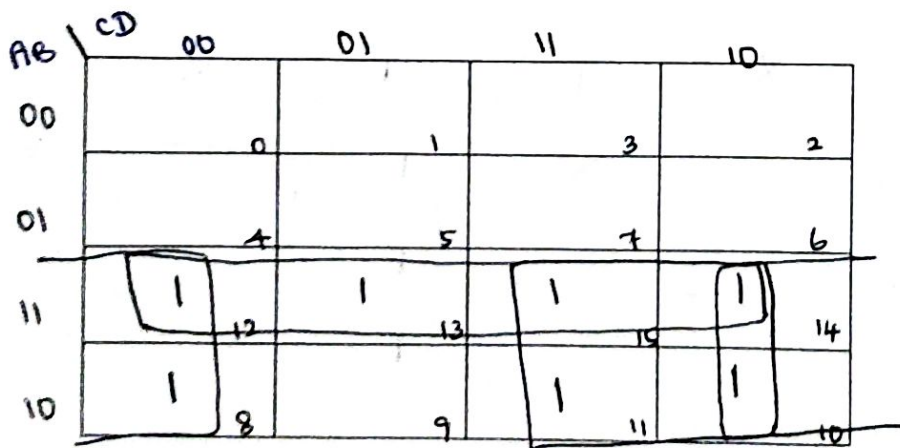


7)  $Y = ABCD + AB'C'D' + AB'C + AB$

$$= ABCD + A\bar{B}\bar{C}\bar{D} + A\bar{B}C(D + \bar{D}) + AB(C + \bar{C})(D + \bar{D})$$

$$= ABCD + A\bar{B}\bar{C}\bar{D} + A\bar{B}CD + A\bar{B}C\bar{D} + ABCD + ABC\bar{D} + AB\bar{C}D + AB\bar{C}\bar{D}$$

$$Y = \underset{(15)}{ABCD} + \underset{(8)}{A\bar{B}\bar{C}\bar{D}} + \underset{(11)}{A\bar{B}CD} + \underset{(10)}{A\bar{B}C\bar{D}} + \underset{(13)}{ABC\bar{D}} + \underset{(14)}{AB\bar{C}D} + \underset{(12)}{AB\bar{C}\bar{D}}$$



$$Y = AB + A\bar{D} + AC$$