SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECB202 – LINEAR AND DIGITAL CIRCUITS

II YEAR/ III SEMESTER

UNIT 3 – GATES AND MINIMIZATION TECHNIQUES

TOPIC 7 - KARNAUGH MAP MINIMIZATION - Problems

1. Plot the logical expression ABCD+AB'C'B'+AB'C+AB on a 4 variable K-map and obtain the simplified expression from the K- map.

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

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

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

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

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

$$= m_{15} + m_8 + m_{11} + m_{10} + m_{14} + m_{13} + m_{12}$$

$$= \Sigma_m(8,10,11,12,13,14,15)$$

$$Y = AB + AC + AD'$$

2. Simplify the expression Y=$\sum$m(7,9,10,11,12,13,14,15),using the K- map method.

Y=AB+AD+AC+BCD

Y=AB+AD+AC+BCD

=A(B+D+C)+BCD

Don't Care Conditions

➤ Don't Care conditions allow us to replace the empty cell of a K-Map to form a grouping of the variables.

➤ While forming groups of cells, we can consider a "Don't Care" cell as either 1 or 0 or we can simply ignore that cell.

➤ Don't Care condition can help us to form a larger group of cells.

Don't Care Conditions

1.Simplify the Boolean function

$F(A,B,C,D)= \sum m(1,3,7,11,15)+ \sum d(0,2,5)$

$$Y = \overline{A}\,\overline{B} + CD$$

CD \ AB	00	01	11	10
00	d	0	0	0
01	1	d	0	0
11	1	1	1	1
10	d	0	0	0

THANK YOU