

Assignment 2

CS3853

①	Input				Decimal	Output			
	A	B	C	D		W	X	Y	Z
0	0	0	0	0	0	0	0	0	1
1	0	0	0	1	1	0	0	1	0
2	0	0	1	0	2	0	0	1	1
3	0	0	1	1	3	0	1	0	0
4	0	1	0	0	4	0	1	0	1
5	0	1	0	1	5	0	1	1	0
6	0	1	1	0	6	0	1	1	1
7	0	1	1	1	7	1	0	0	0
8	1	0	0	0	8	1	0	0	1
9	1	0	0	1	9	1	0	1	0
10	1	0	1	0	10	1	0	1	1
11	1	0	1	1	11	1	1	0	0
12	1	1	0	0	12	1	1	0	1
13	1	1	0	1	13	1	1	1	0
14	1	1	1	0	14	1	1	1	1
15	1	1	1	1	15	0	0	0	0

Sum of min terms

$$W = \text{Sum}(7, 8, 9, 10, 11, 12, 13, 14)$$

$$= \cancel{A'BCD} + \cancel{AB'C'D}$$

$$= \cancel{A'BCD} + \cancel{AB'C'D} + \cancel{AB'C'D} +$$

> Sum of Min terms & Product of Max terms

$$W = \text{Sum}(7, 8, 9, 10, 11, 12, 13, 14) \\ = M_7 + M_8 + M_9 + M_{10} + M_{11} + M_{12} + M_{13} + M_{14}$$

$$W = A'BCD + AB'C'D' + AB'C'D + AB'CD' + AB'CD \\ + ABC'D' + ABC'D + ABCD'$$

$$W = \text{Product}(0, 1, 2, 3, 4, 5, 6, 15) \\ = M_0 * M_1 * M_2 * M_3 * M_4 * M_5 * M_6 * M_{15} \\ = \cancel{ABCD} *$$

$$W = (A+B+C+D) * (A+B+C+D') * (A+B+C'+D) * \\ (A+B+C'+D') * (A+B'+C+D) * (A+B'+C+D') * \\ (A+B'+C'+D) * (A'+B'+C'+D')$$

Karnaugh Map

	CD			
	00	01	11	10
AB				
00				
01				
11	1	1		1
10	1	1	1	1

Groupings:
 - A vertical group of four 1s (rows 11, 10, columns 00, 01) is labeled 'B'.
 - A vertical group of two 1s (rows 11, 10, column 11) is labeled 'C'.
 - A vertical group of two 1s (rows 11, 10, column 10) is labeled 'D'.
 - A horizontal group of two 1s (columns 11, 10, row 10) is labeled 'A'.

$$\textcircled{a} = AB'C'D' + AB'C'D + AB'CD \\ + AB'CD'$$

$$= AB'$$

$$\textcircled{b} = ABC'D' + AB'CD' + \\ ABCD' + AB'CD'$$

$$= AD'$$