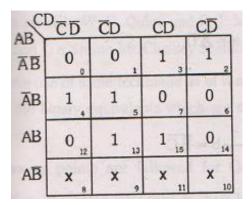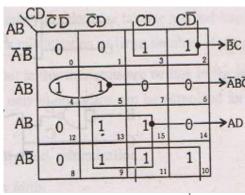# DON't Care condition

- In few logic circuits, output is not given or specified for certain combination of input.

- In such case output level is not defined, it can 'high' or 'low' either '1' or '0'

- These output are denoted are 'd' or 'x'or 'Φ

- Example:

    Minimize the flowing function using K – map. Right truth table and implementing the circuit .

$$f(A, B, C, D, E) = \sum m(2, 4, 5, 13, 15) + \sum d(8, 9, 10, 11)$$

AB \ CD	$\overline{C}\overline{D}$	$\overline{C}D$	CD	$C\overline{D}$
$\overline{A}\overline{B}$	0	0	1	1
	0	1	3	2
$\overline{A}B$	1	1	0	0
	4	5	7	6
AB	0	1	1	0
	12	13	15	14
$A\overline{B}$	x	x	x	x
	8	9	11	10

AB \ CD	$\overline{C}\overline{D}$	$\overline{C}D$	CD	$C\overline{D}$	
$\overline{A}\overline{B}$	0	0	1	1	→$\overline{B}C$
	0	1	3	2	
$\overline{A}B$	1	1	0	0	→$\overline{A}B\overline{C}$
	4	5	7	6	
AB	0	1	1	0	→AD
	12	13	15	14	
$A\overline{B}$	0	1	1	1	
	8	9	11	10	

- Example:

    Minimize the flowing function using K – map. Right truth table and implementing the circuit using NAND gate only.

$$f(A, B, C, D, E) = \sum m(\,2, 4, 5, 13, 15) + \sum d(8, 9, 10, 11)$$

Minimization of product of Sum from using K map

Decimal Number	Variables			Maxterms	Maxterm Designation
	A	B	C		
0	0	0	0	$A + B + C$	M_0
1	0	0	1	$A + B + \overline{C}$	M_1
2	0	1	0	$A + \overline{B} + C$	M_2
3	0	1	1	$A + \overline{B} + \overline{C}$	M_3
4	1	0	0	$\overline{A} + B + C$	M_4
5	1	0	1	$\overline{A} + B + \overline{C}$	M_5
6	1	1	0	$\overline{A} + \overline{B} + C$	M_6
7	1	1	1	$\overline{A} + \overline{B} + \overline{C}$	M_7