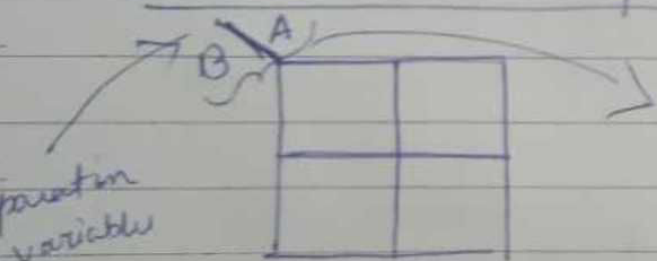


## K-Map :- (Karnaugh Map)

- Developed by Karnaugh in 1953
- Used to simplify boolean algebraic expressions without using Boolean laws.

### 2-variable K-Map.

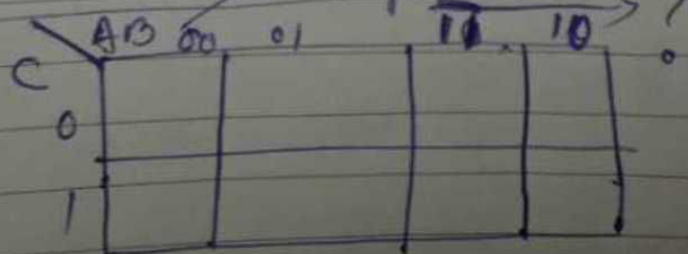


$2^2$  cells = 4 cells  
can interchange the positions.

2 var "number of cells =  $2^n$ "

$n$  = no. of variable.

### 3 variable K-map:-



$2^3 = 8$  cells -

Horizontal representation

A \ Bc	A	
	0	1
00		
01		
11		
10		

Vertical representation.

4-variable K-Map:—

$2^4 = 16$  cells.

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

~~slit cell e e e e~~

WK 27 (188-177)

SUNDAY

ABCD = 1111

ABCD = 0111

07

AUGUST

## Rules for K-Map Simplification:-

1. Groups may not contain zero.

2. We can group 1, 2, 4, 8 (or)  $2^n$  cells.

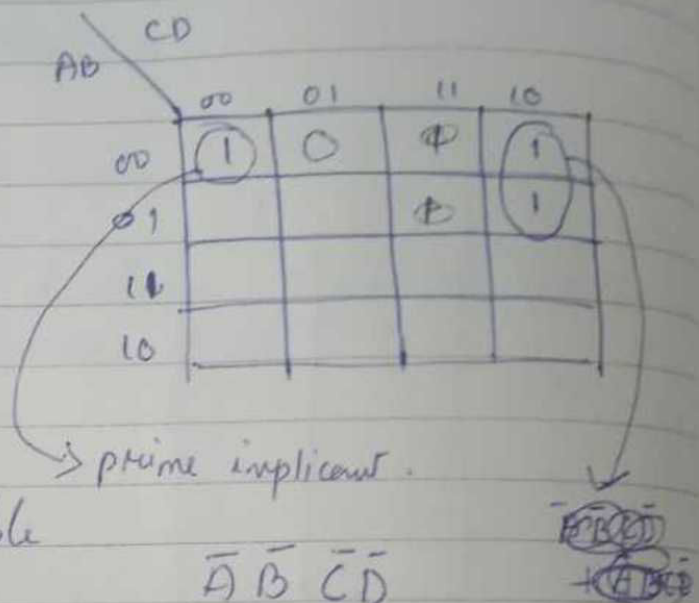
3. Each group should be as large as possible

4. cells containing 1 must be grouped

5. Groups may overlap.

6. Opposite grouping and corner grouping is allowed.

7. There should be as few groups as possible.



For SOP, groups may not contain 0.

group single variable

2

Quartet (4 variables)

Octate (8 variables)

5 6 7 8 9 10 11 12 13 14 15 16 17 18  
 19 20 21 22 23 24 25 26 27 28 29 30 31

JULY - TUESDAY

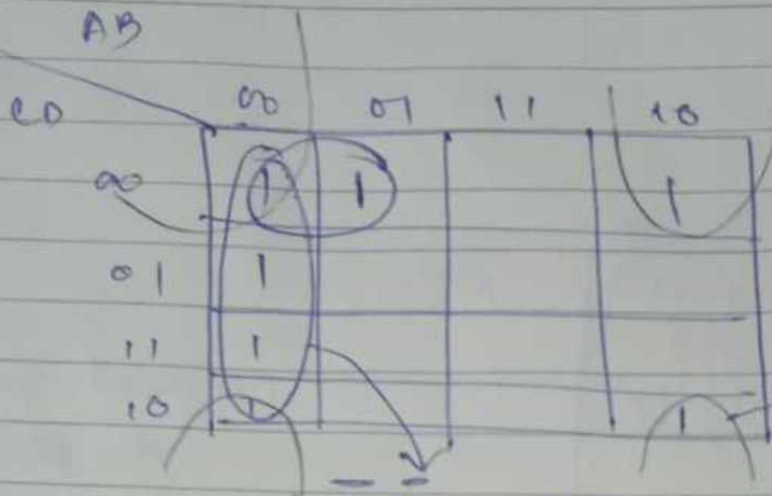
AB \ CD	00	01	11	10
00			1	1
01			1	1
11				
10				

$\overline{A}C$

no need to take double grouping

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

$A$

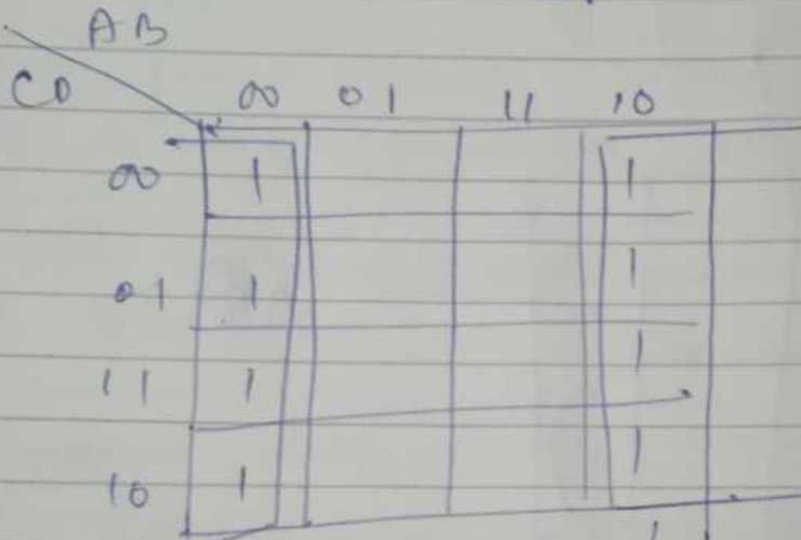


corner grouping

$\overline{D}\overline{B}$

$$\overline{A}B + \overline{A}\overline{C}\overline{D}$$

See first  
if octate  
is poss  
then  
greater  
then



opposite grouping

$\overline{B}$



In the sum of product function  $f(x, y, z) = \Sigma(2, 3, 4, 5)$

The prime implicants are

- (a)  $\bar{x}y, x\bar{y}$
- (b)  $\bar{x}y, x\bar{y}\bar{z}, x\bar{y}z$
- (c)  $\bar{x}y\bar{z}, \bar{x}yz, x\bar{y}$
- (d)  $\bar{x}y\bar{z}, \bar{x}yz, x\bar{y}\bar{z}, x\bar{y}z$

(Gate 2007)