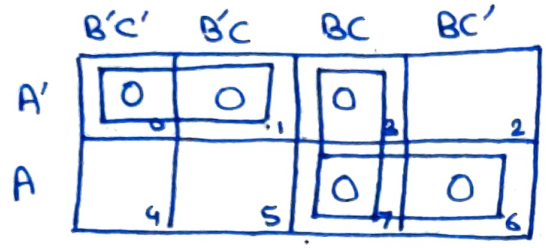
Aryaman

Q) $F = \prod_M (0,1,3,6,7)$ [POS]



2 Pairs

Thus Simplified

$\Rightarrow (A'+B')(B+C)(A+B)$

Since its POS,

0,1 $\Rightarrow (A'+B'+C')(A'B+B'+C) \Rightarrow (A'+B')$

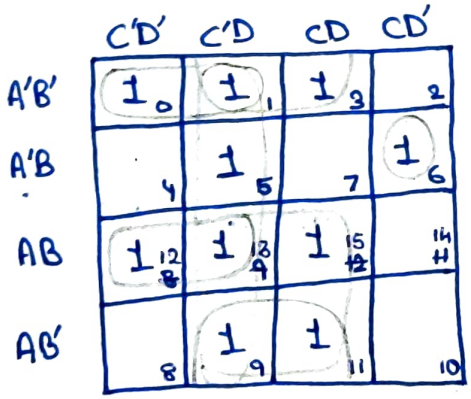
3,7 $\Rightarrow (A'+B+C)(A+B+C) \Rightarrow (B+C)$

7,6 $\Rightarrow (A+B+C)(A+B+C') \Rightarrow (A+B)$

Q) $F = \sum_m (0,1,3,5,6,9,11,13,15)$

(LSB → Least significant Bit)
(MSB → Most significant Bit)

Four variables since max number is 15. → ($M \leq 7$ 3 var, $M \leq 15$ 4 var)



16 Box K-Map

3 Quads

1, 5, 13, 9 → C'D
13, 15, 9, 11 → AD
9, 11, 1, 3 → B'D

} Essential Prime Implicants (Largest Comb.)

2 Pairs

0,1 → A'B'C'
12,13 → ABC'

1 Singular

6 → A'BCD'

Prime implicants are the largest combination of units aka quads eschosen

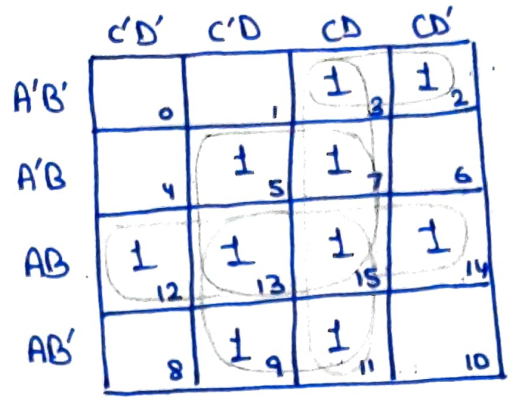
$F = A'BCD' + A'B'C' + ABC' + C'D + AD + B'D$

Form
→ AOI Logic
→ NAND Logic (Better)
→ NOR Logic

∴ Since SOP

Aryaman

Q) $F = \sum_m (2,3,5,7,9,11,12,13,14,15)$



~~4 Quads~~
~~5,7,13,15~~

3 Quads
→ 5,7,13,15
→ 13,15,9,11
→ 12,13,15,14

1 Pair
→ 3,2

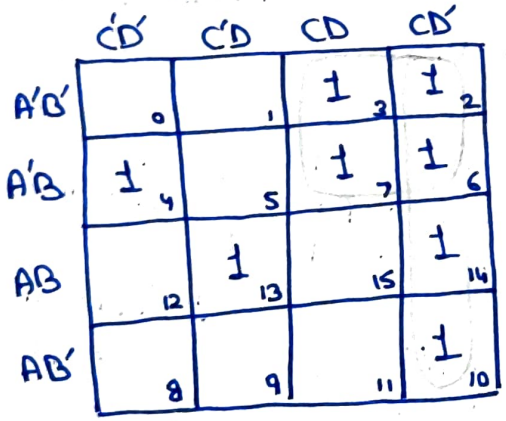
1 Redundant Quad
→ 3,7,15,11

Removing / Not involving it will keep number of terms same

$F = AB + AD + BD + A'B'C$

- NAND-NAND logic → 7 gates (Better ∵ SOP form)
- NOR-NOR logic → 13 gates

Q) $F = \sum_m (2,3,4,6,7,10,13,14)$



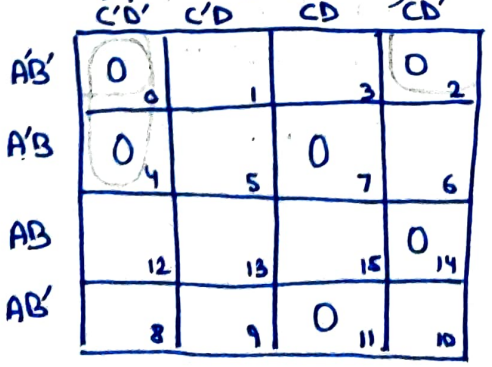
2 Quads
(2,3,6,7) and (2,6,14,10)

1 Pair
(1,6)

$F = A'BD' + ABC'D + A'C + CD'$

- NAND-NAND Logic → 10 gates (Better)
- NOR-NOR Logic → 12 gates

Q) $F = \prod_M (0,2,7,11,14)$



$F = (B+C'+D')(A+B+D')(A'+C+D)(A+B'+D)(A+B'+C'+D')(A'+B'+C'+D)(A'+B+C'+D')$