K-Maps with Don't Care Condition

→ The Don't Care Conditions are used to replace the empty cell to form a possible grouping of variables.

→ They can either '0' or '1', based on adjecent cells of the group.

→ Don't Care cells can be represented as * or X

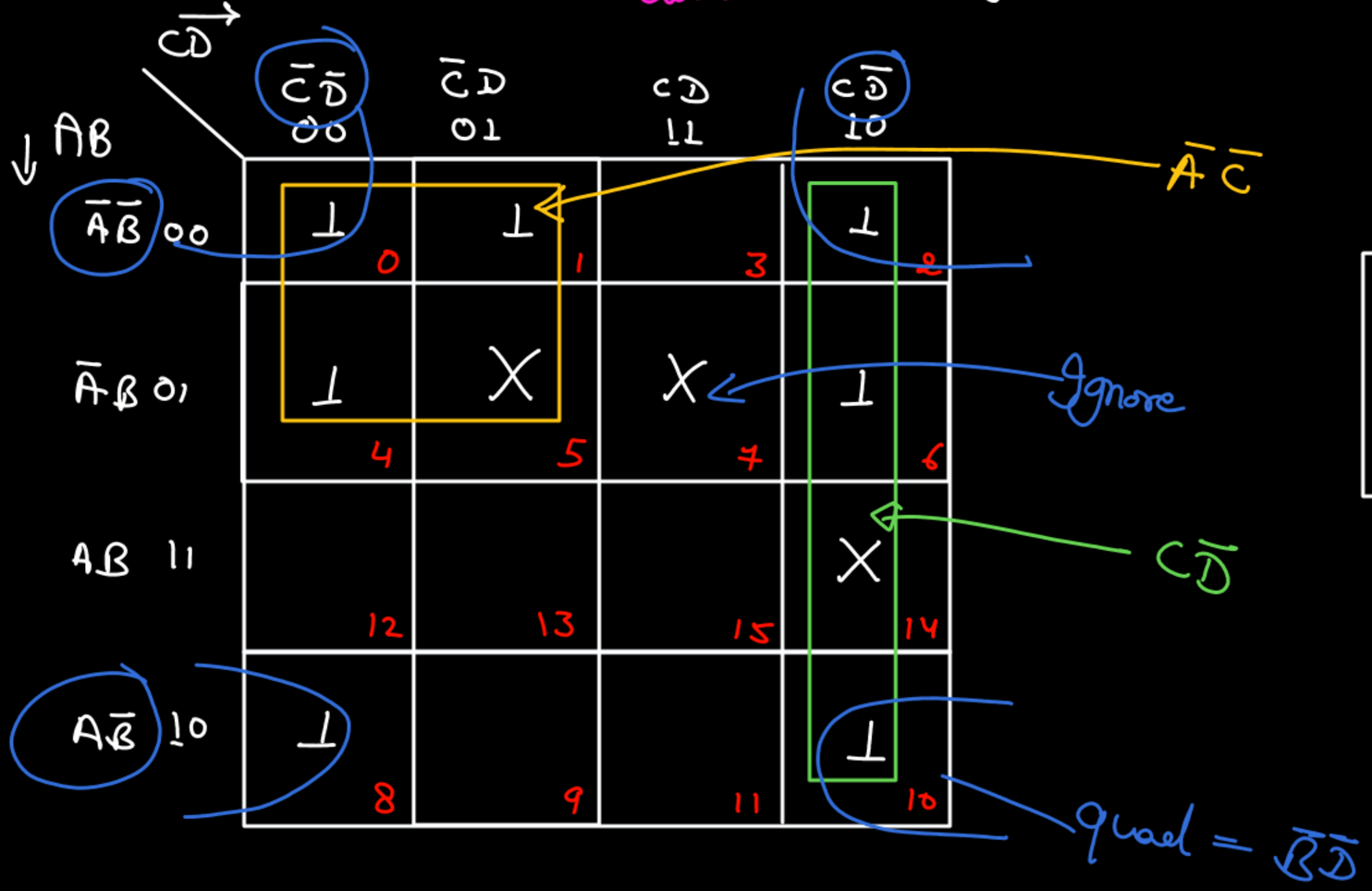
Eg $f(A,B,C,D) = \sum m(0,1,2,4,6,8,10) + d(5,7,14)$

$\sum m$ ↓ essential

d ↓ optional

Eg $f(A,B,C,D) = \sum m(0,1,2,4,6,8,10) + d(5,7,14)$

essential — fill by 1 — optional — fill by X

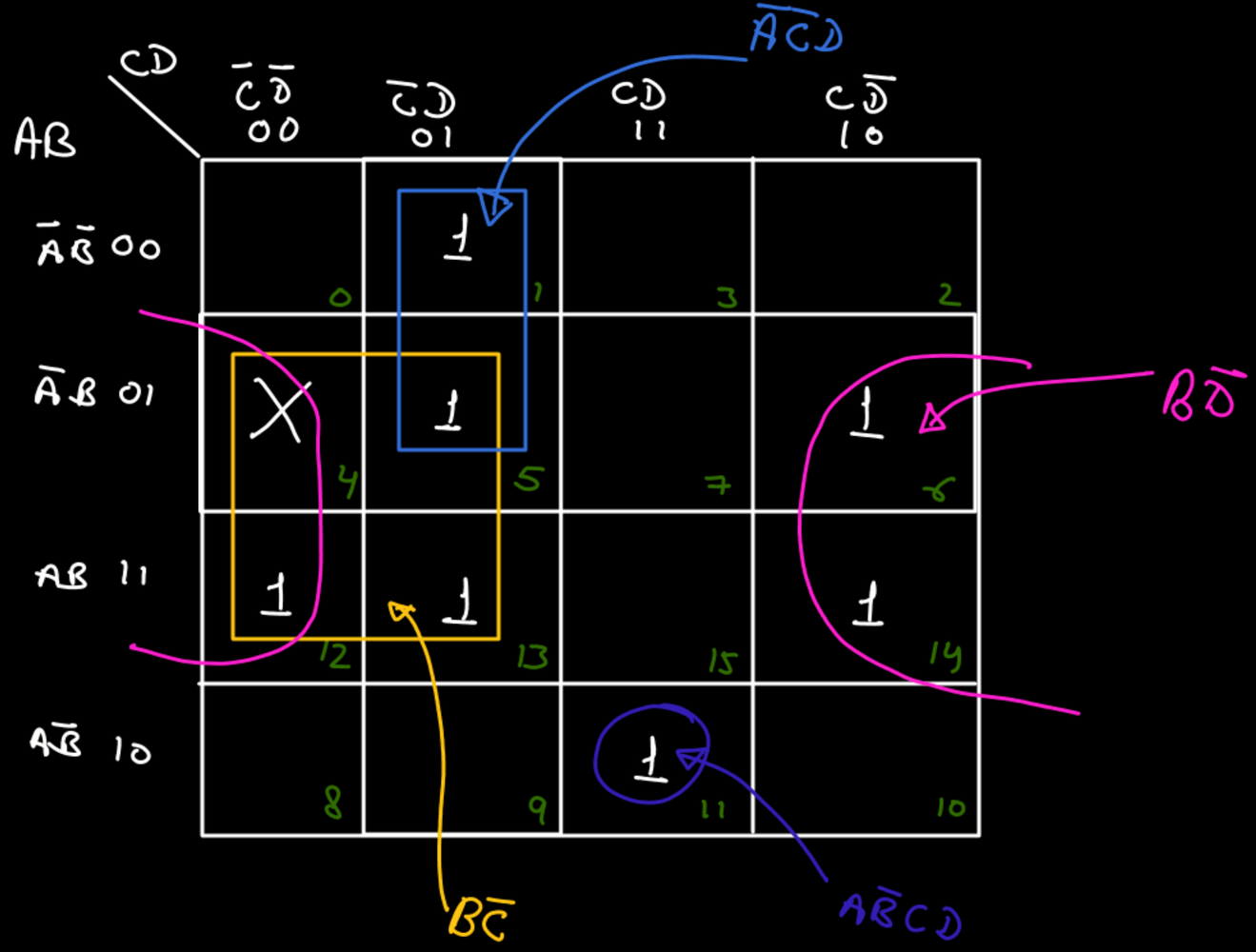


$$f = \bar{A}\bar{C} + C\bar{D} + \bar{B}\bar{D}$$

*tip → Minimal grouping with Don't Care Condition

Q Minimise the following function in SOP form.

$$f = \sum m(1,5,6,11,12,13,14) + d(4)$$

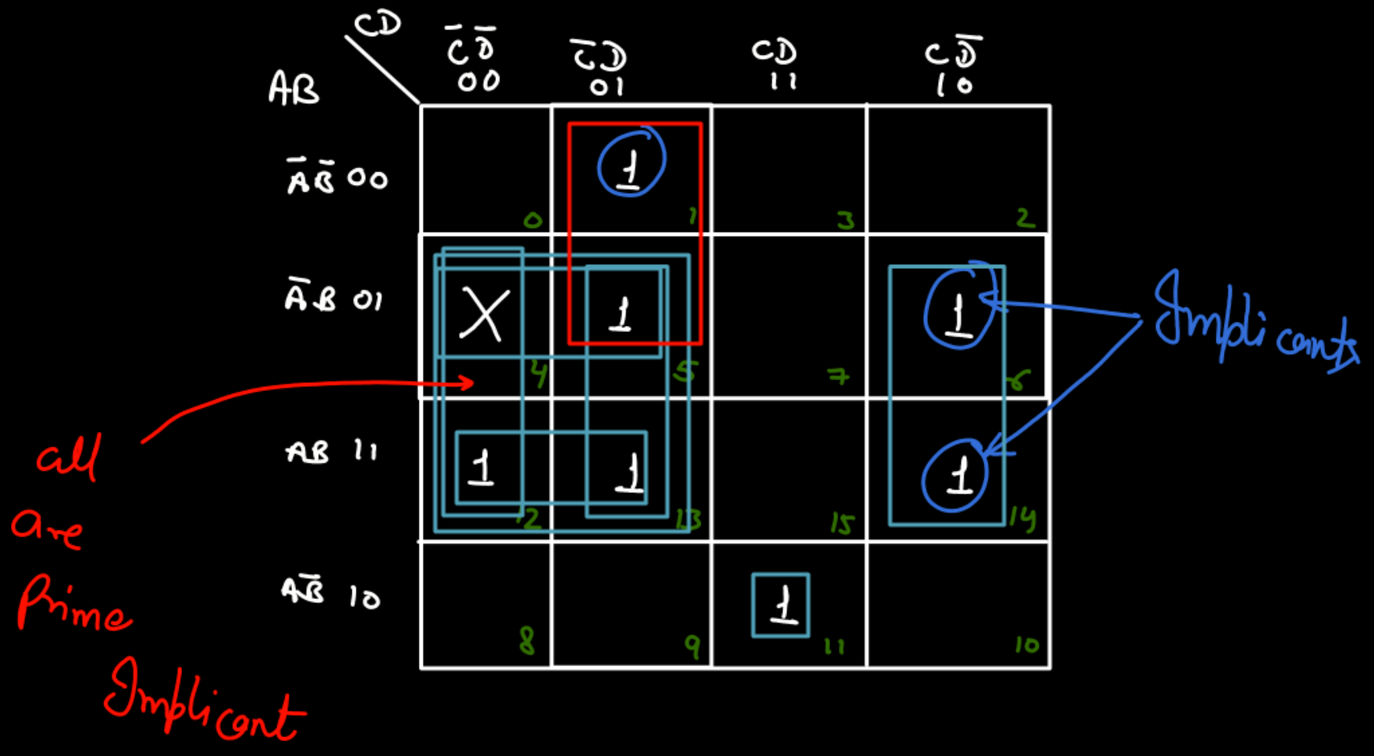


$$f = \bar{A}\bar{C}D + B\bar{C} + B\bar{D} + A\bar{B}CD$$

K-Maps (Most important Terminologies)

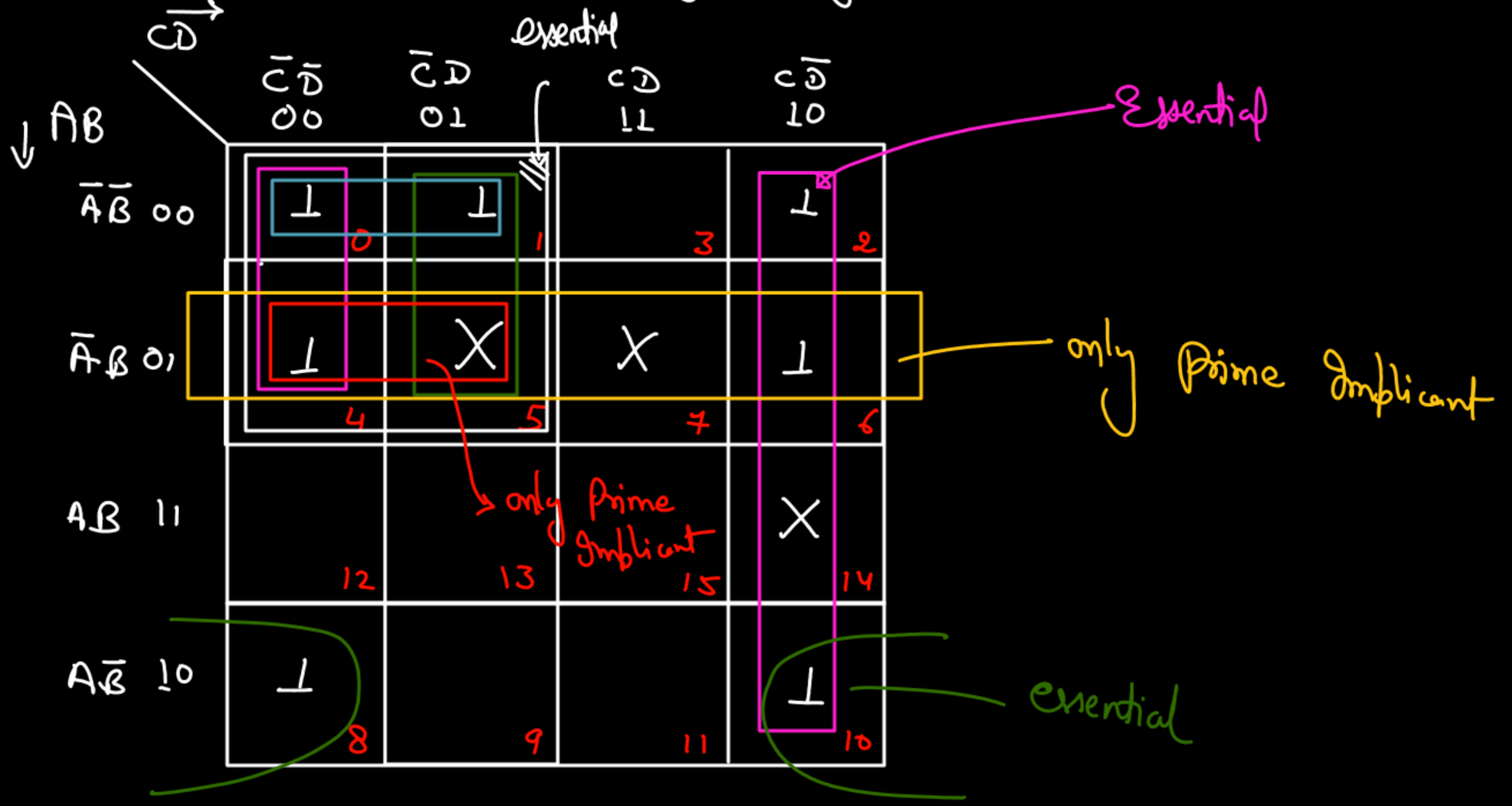
1) **Implicant** : It is nothing but a minterm or maxterm

2) **Prime Implicant**: It is formed by grouping the maximum possible adjecent cells.

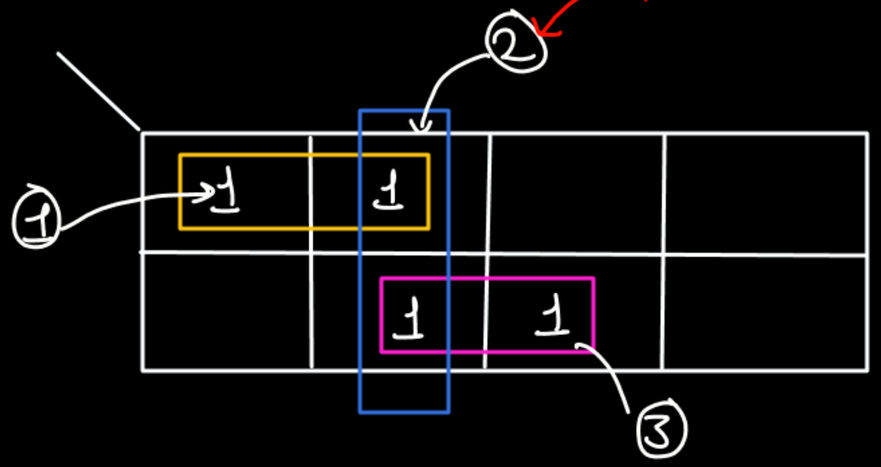


3) Essential Prime Implicant :

It is a prime implicant which consist atleast one minterm.
& It is not covered by any other prime implicant.



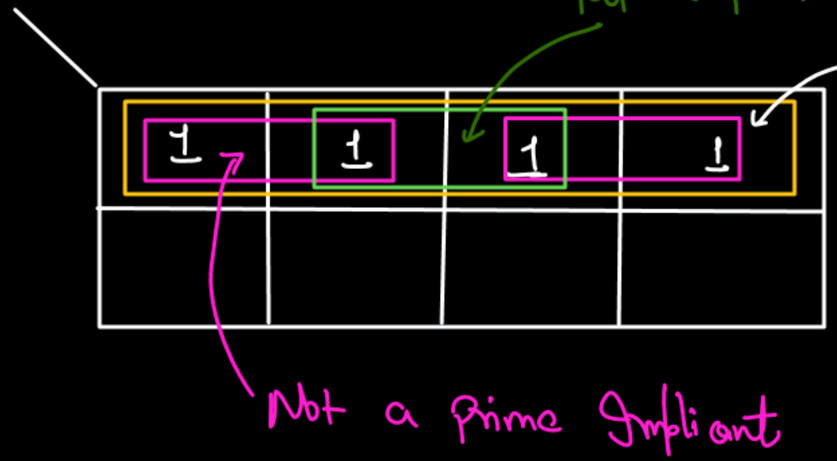
Prime Implicant :



here their are 3 prime Implicant

(1) & (3) are Essential prime Implicant

* form as large group as possible from all the Combination.



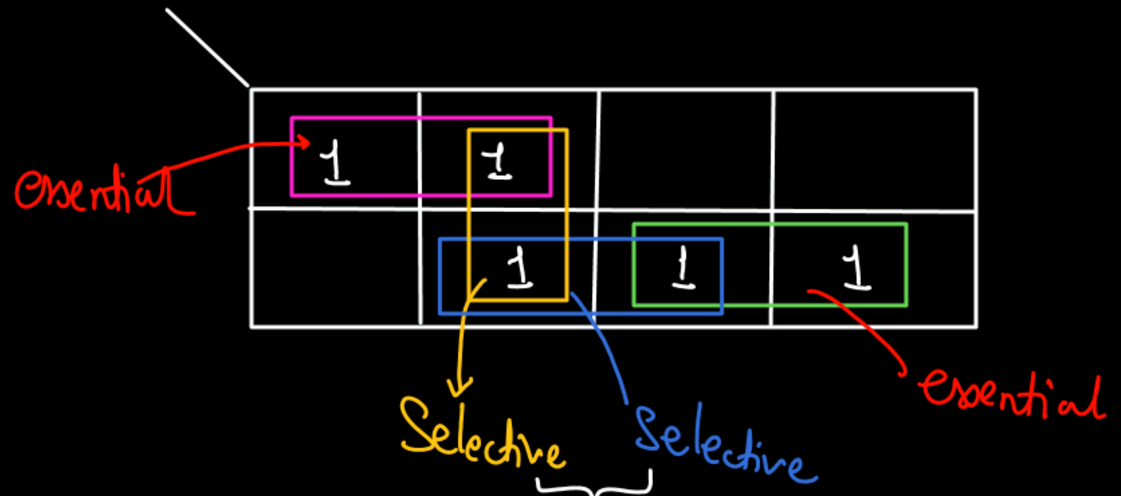
Important

* Do Not form a Smaller group within a large group

→ Do NOT form a quad inside an octate

→ Do NOT form a pair inside a quad.

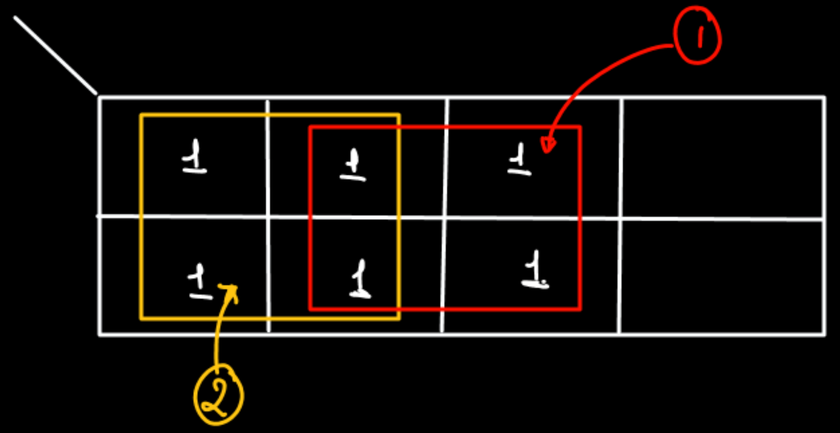
Selective Prime Implicant:



Any group can be used, hence both are selective prime implicant

No. of Selective Prime Implicants = 2

Eg

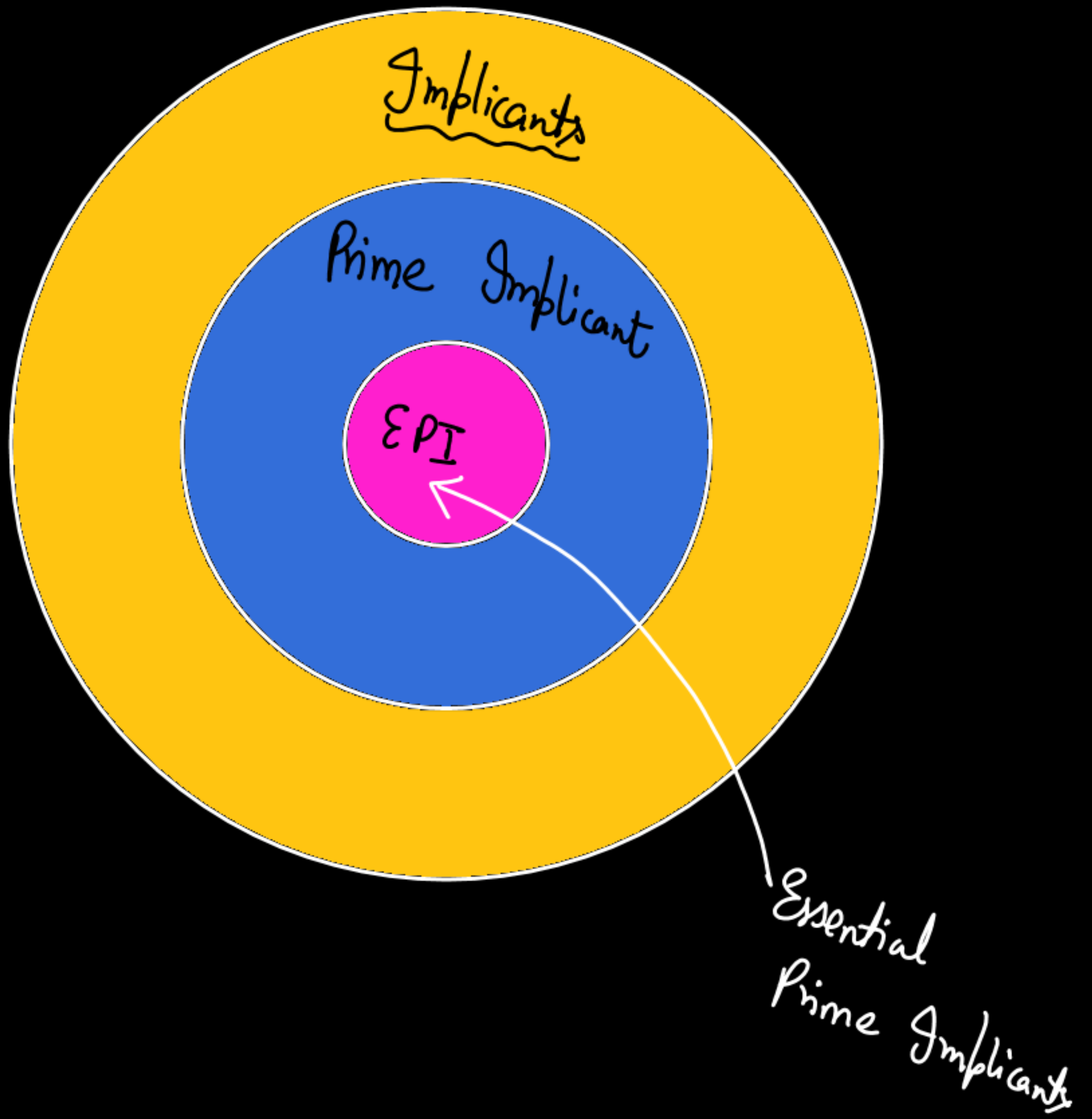


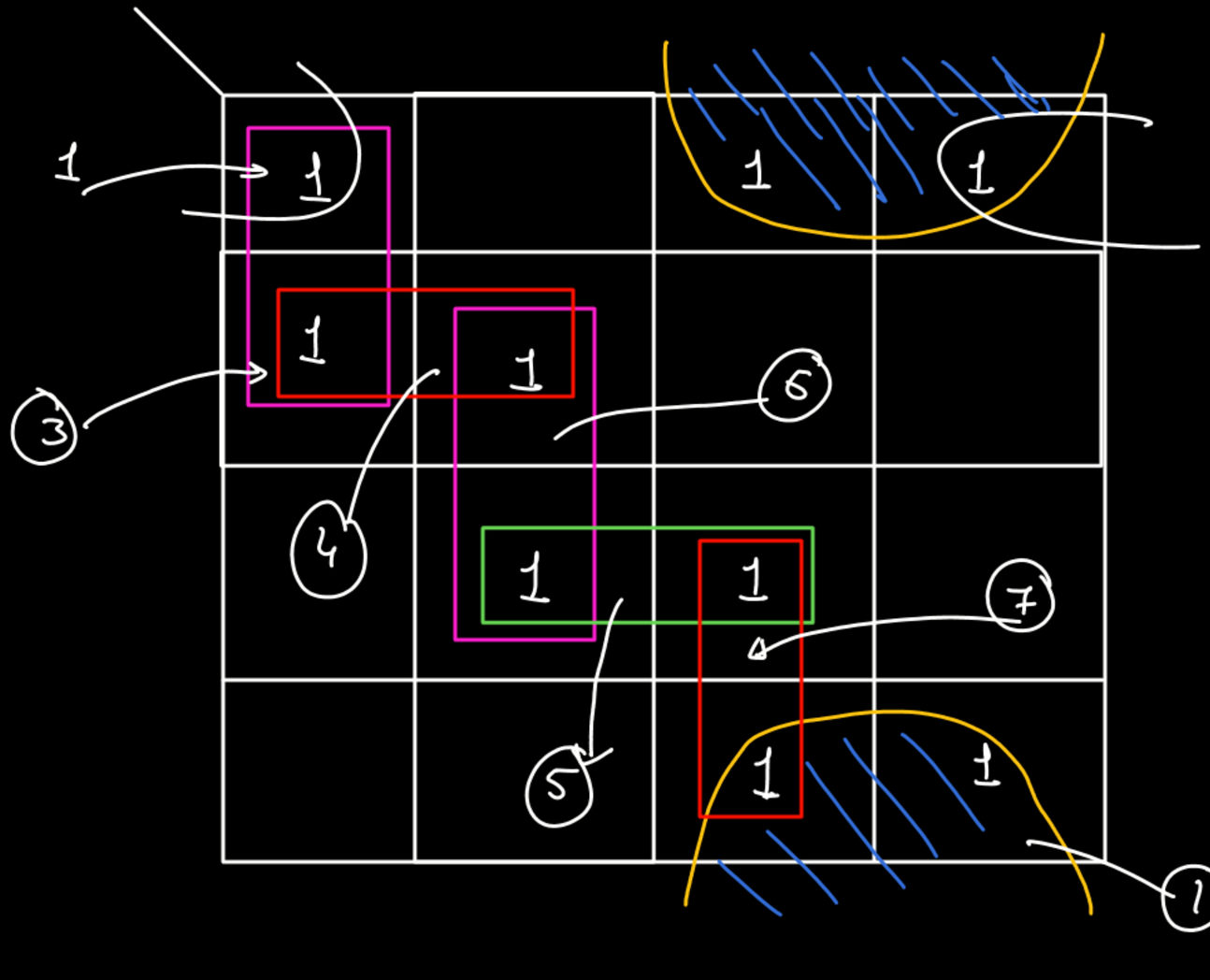
Prime Implicants = 2 Implicant = 6

Essential P.I = 2

Redundant P.I. = 0

Selective P.I = 0





Implicants = 9

Prime Implicants = 7

Redundant = 0

Selective = 6 → any of them

Essential P.I = 1

असली खेल

↳ Combinational Circuits (Comb) & Arithmetic

↓

COA