CS & IT ENGINEERING

Digital Logic

MINIMIZATION

Lecture No.05

By- CHANDAN SIR

01 THEOREM

02 D-MORGAN'S Law

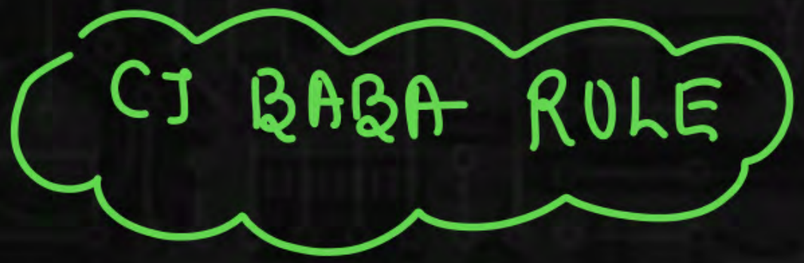
03 QUESTION PRACTICE

04 DUAL & SELF DUAL

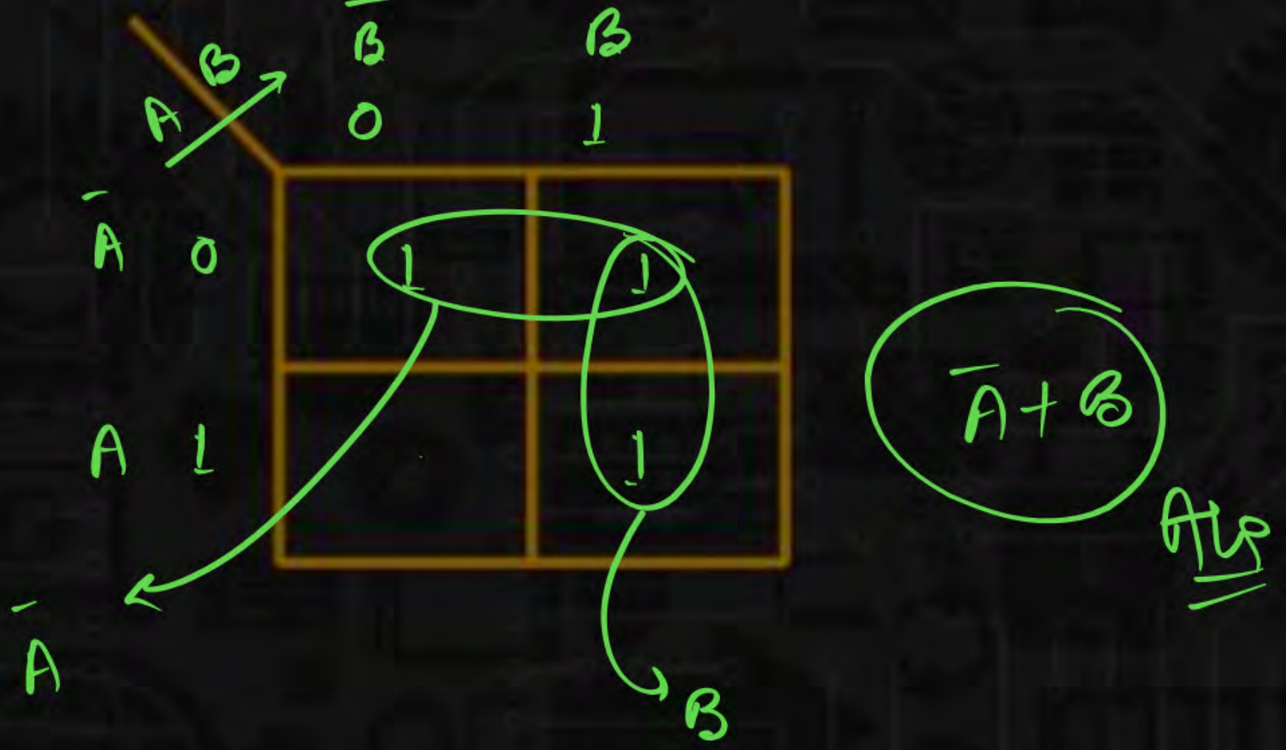
05 DISCUSSION

K Map - Basics

Rule of Minimization



Q.1 $f(A,B) = \overline{A}\,\overline{B} + \overline{A}B + A\overline{B} = \sum m\,(0, 1, 3)$



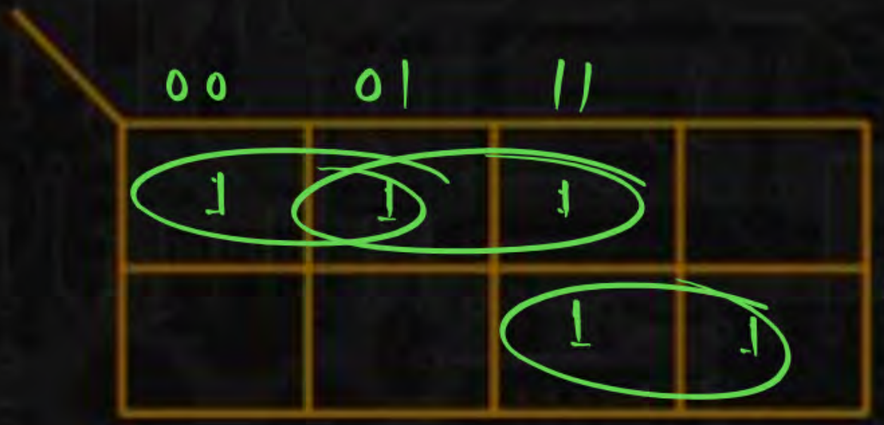
$\overline{A} + B$

Ans

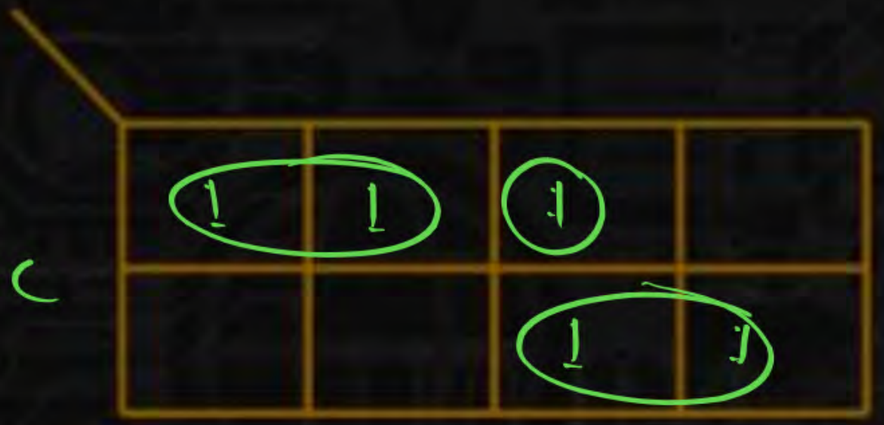
Q.2 $f(A, B) = \overline{A}\,\overline{B} + \overline{A}B + A\overline{B} + AB$

$= 1$

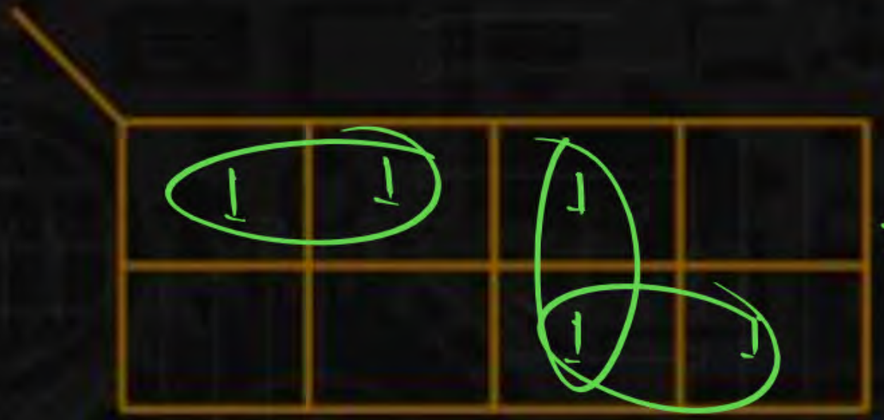
Q.3 $f(A,B,C) = \sum m\,(0, 1, 3, 6, 7)$



$\bar{A}\bar{B} + A\bar{B} + \bar{A}C$

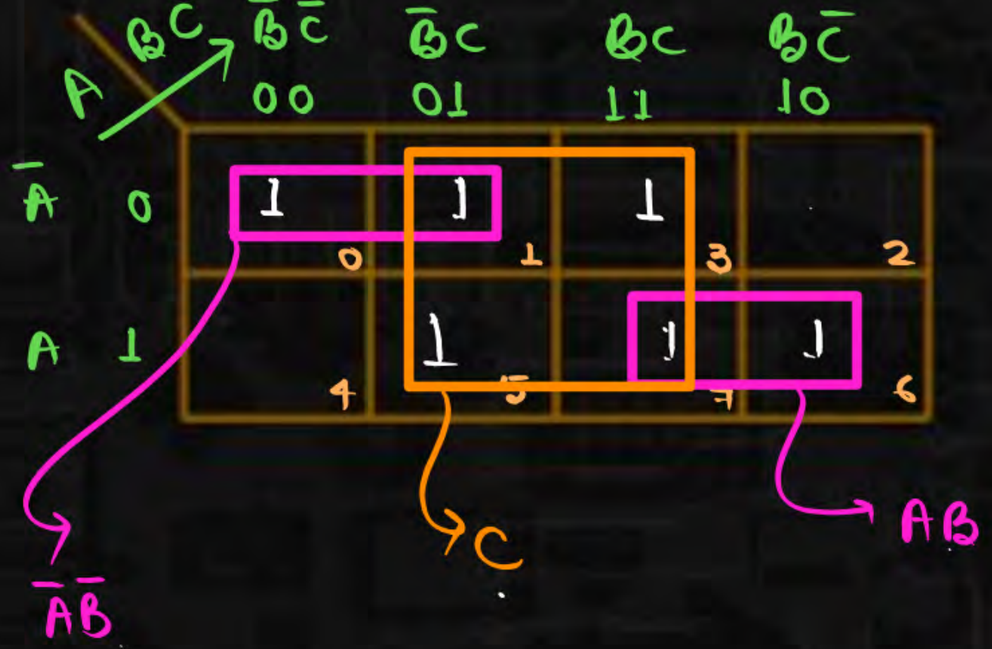


$\bar{A}\bar{B} + AB + \bar{A}BC$



$= \bar{A}\bar{B} + AB + BC$

Q.4 $f(A,B,C) = \sum m\,(0, 1, 3, 5, 6, 7)$



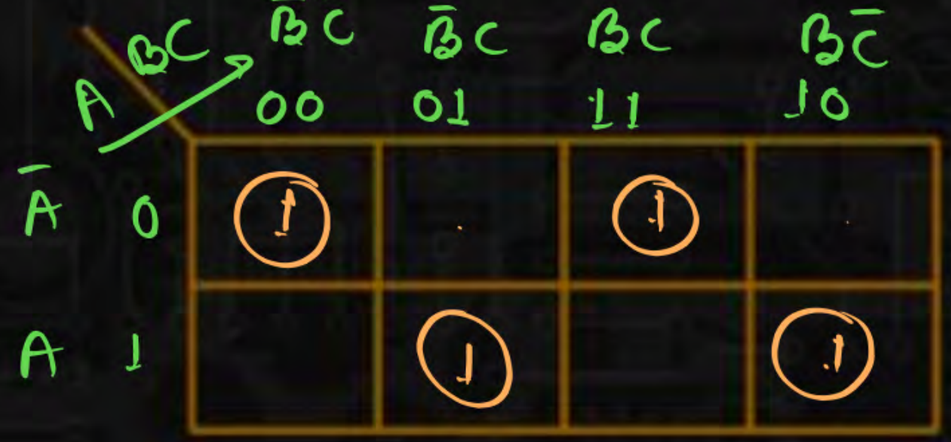
$= \bar{A}\bar{B} + AB + C$

Q.5 $f(A,B,C) = \sum m\,(0, 2, 4, 6)$

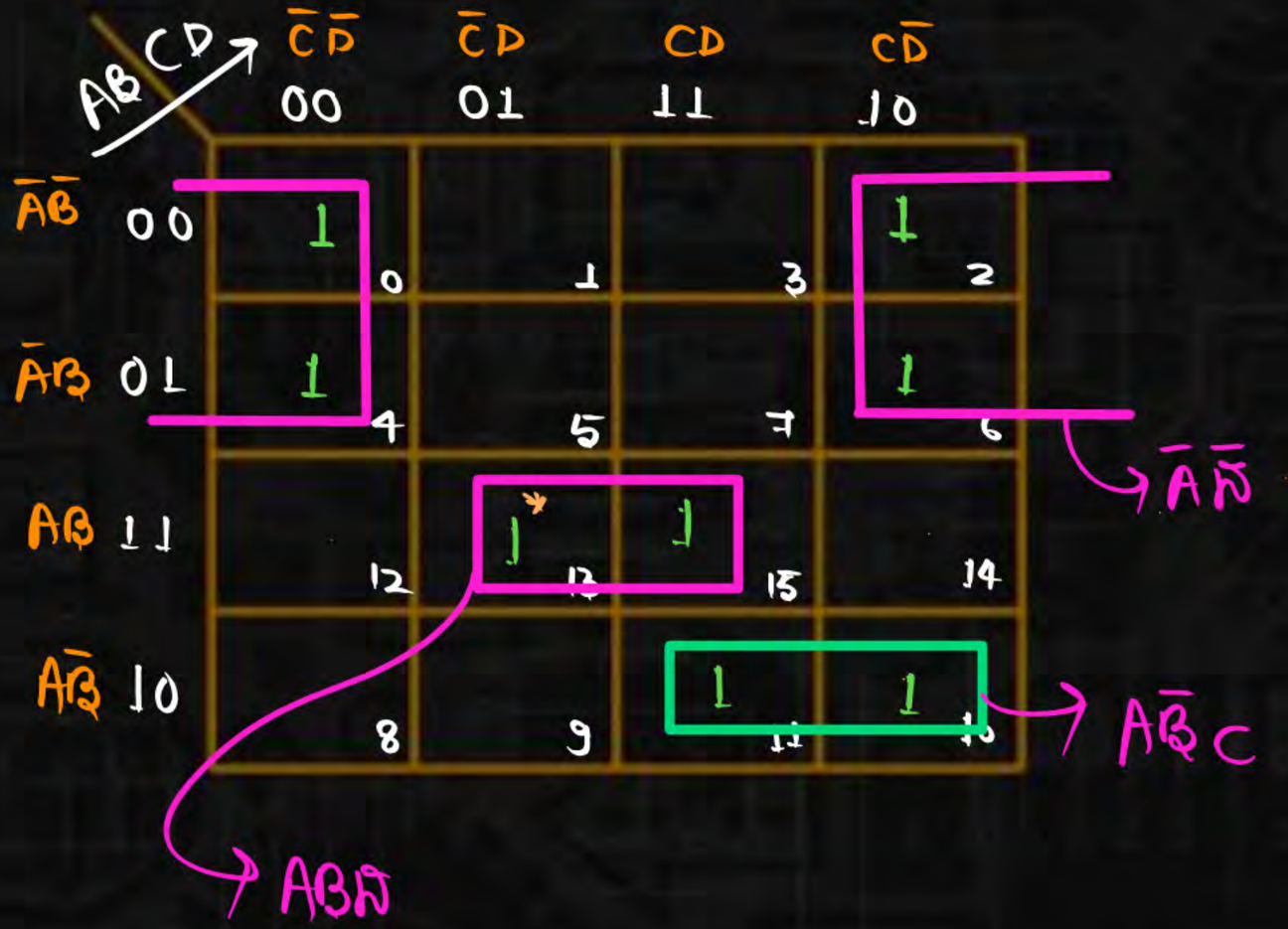
$\Rightarrow \bar{C}$

Ans

Q.6 $f(A,B,C) = \sum m\,(0, 3, 5, 6)$

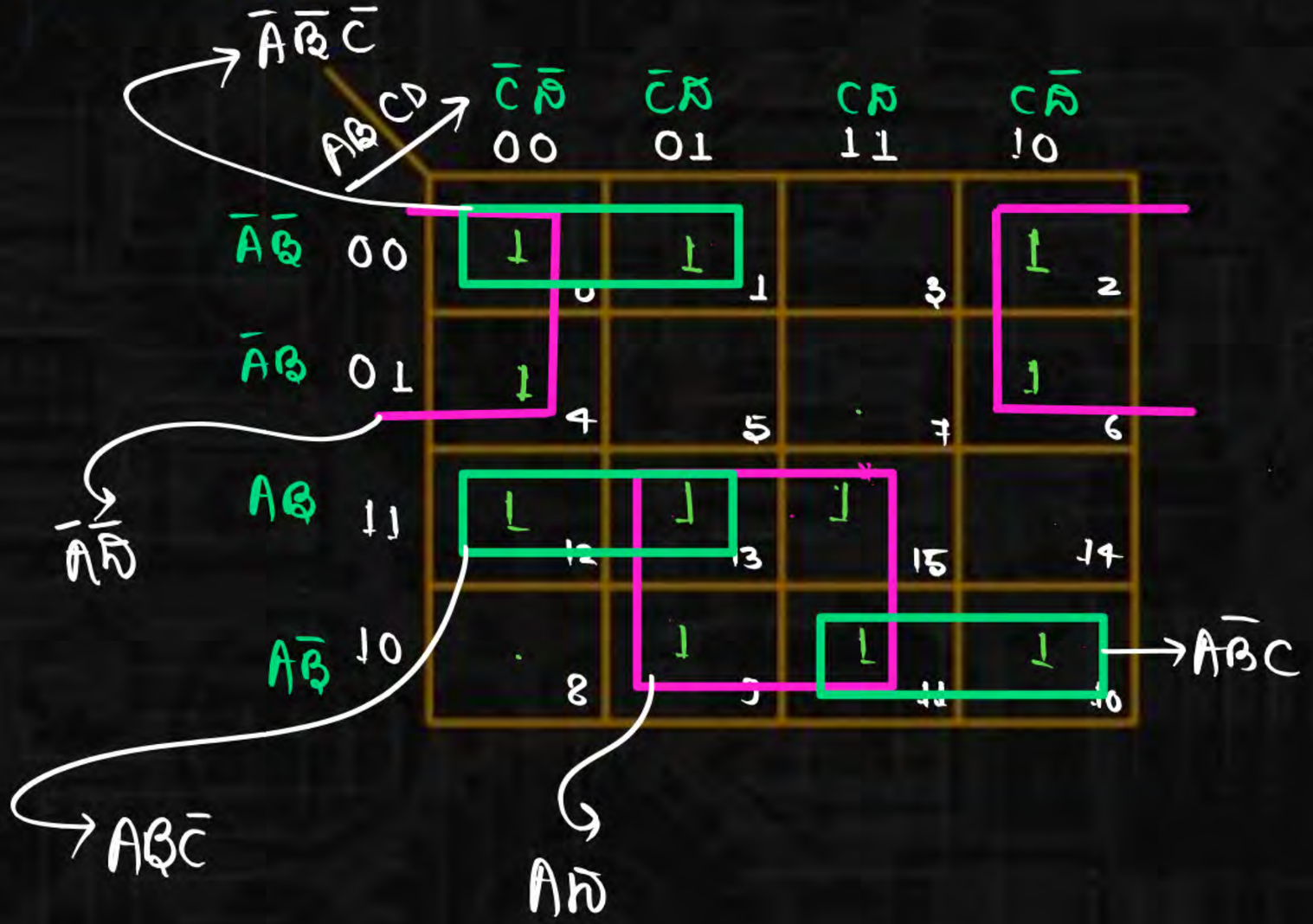


Q.7 $f(A,B,C,D) = \sum_M(0, 2, 4, 6, 10, 11, 13, 15)$



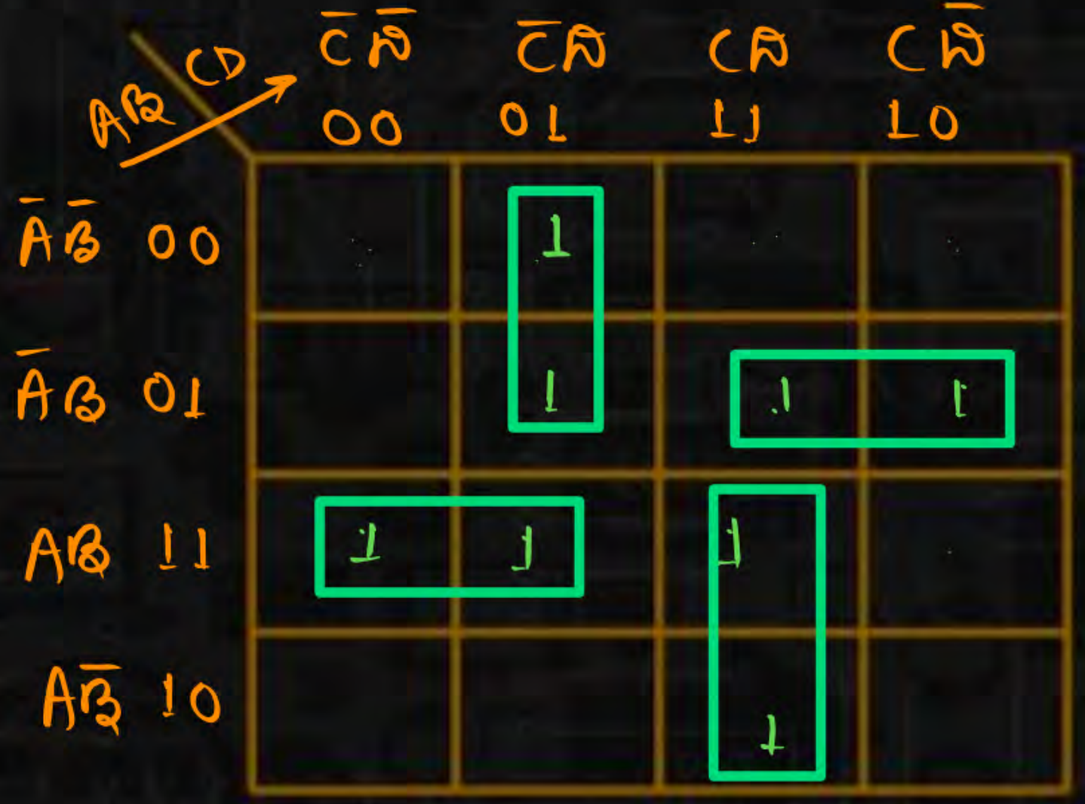
$\bar{A}\bar{D} + AB\bar{D} + A\bar{B}C$

Q.8 $f(A,B,C,D) = \sum m\,(0,1,2,4,6,9,10,11,12,13,15)$



$\Rightarrow \bar{A}\bar{D} + AD + A\bar{B}C + AB\bar{C} + \bar{A}\bar{B}\bar{C}$

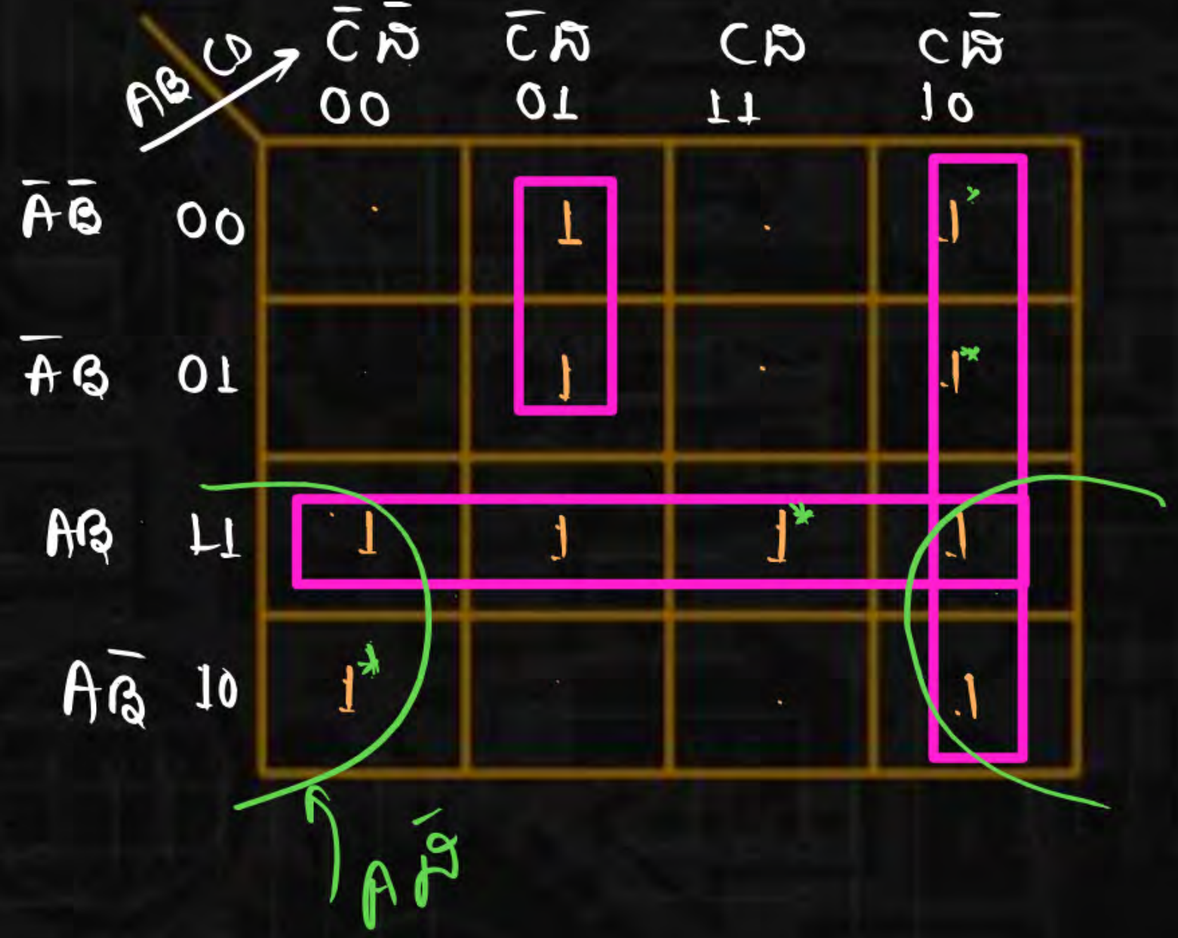
Q.9 $f(A,B,C,D) = \sum m\,(1,5,6,7,11,12,13,15)$



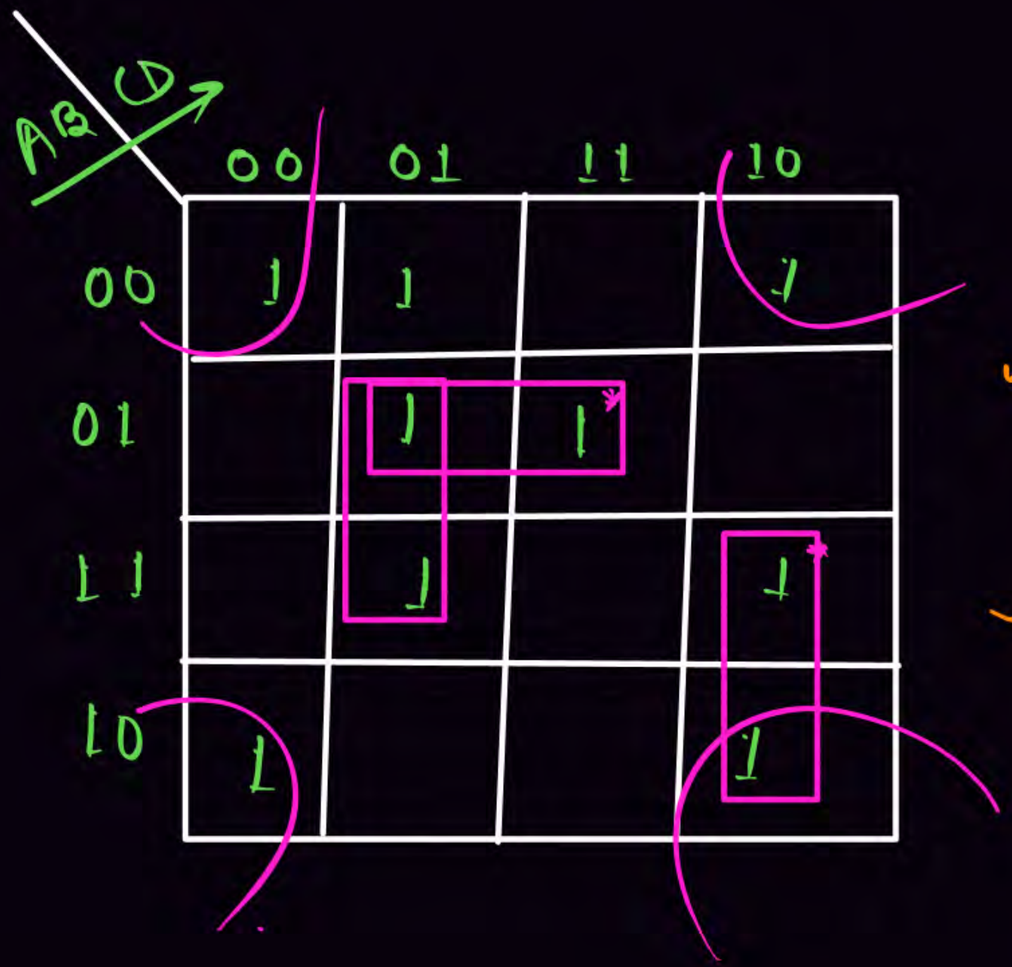
$= AB\bar{C} + \bar{A}\bar{C}D + \bar{A}BC + ACD$

AD

Q.12 $f(A,B,C,D) = \sum m\,(1,3,5,6,8,10,12,13,14,15)$



$AB + C\bar{D} + A\bar{D} + \bar{A}C\bar{D}$



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

$= \bar{B}\bar{D} + B\bar{C}D + \bar{A}BD + AC\bar{D} + \bar{A}\bar{C}D$

Q.12 $f(A,B,C,D) = \sum m(0,5,6,7,11,12,13,15)$

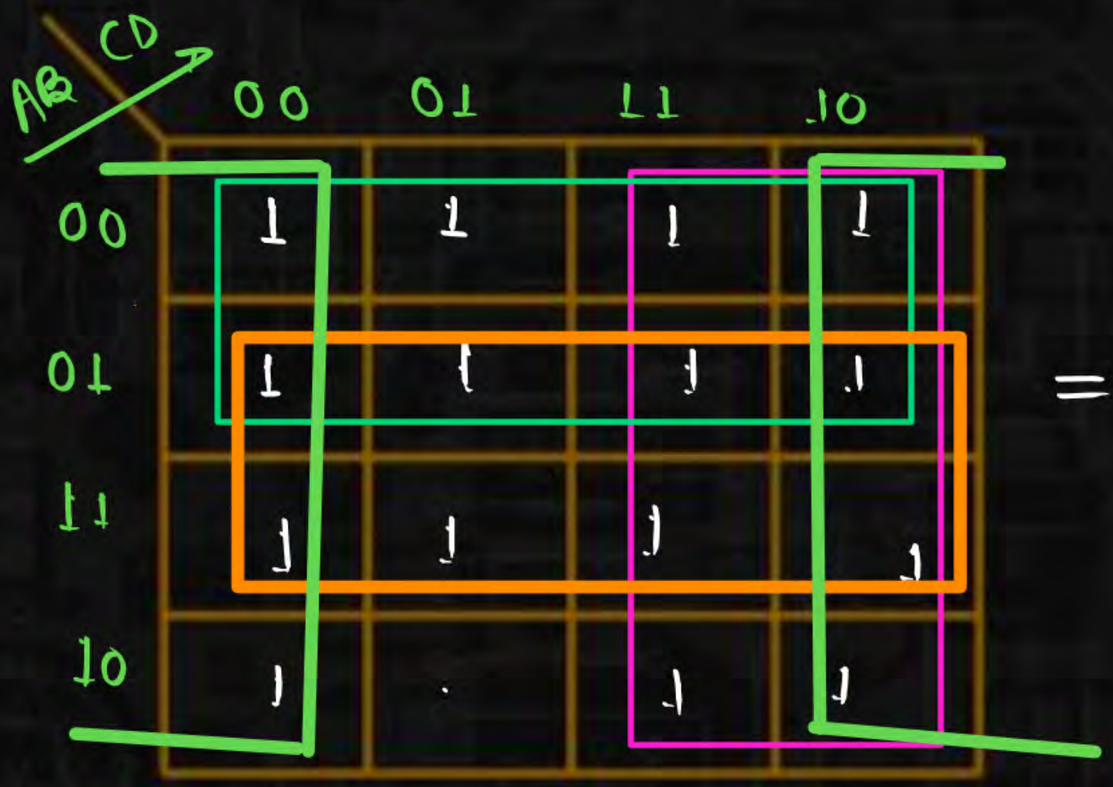
1,4 9,10 14

HW

Q.13 $f(A,B,C,D) = \sum m\,(0, 2, 4, 6, 7, 8, 10, 11, 12, 14, 15)$

HW.

Q.14 $f(A,B,C,D) = \sum m\,(1, 5, 6, 7, 11, 12, 13, 15)$



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

K Map - Basics

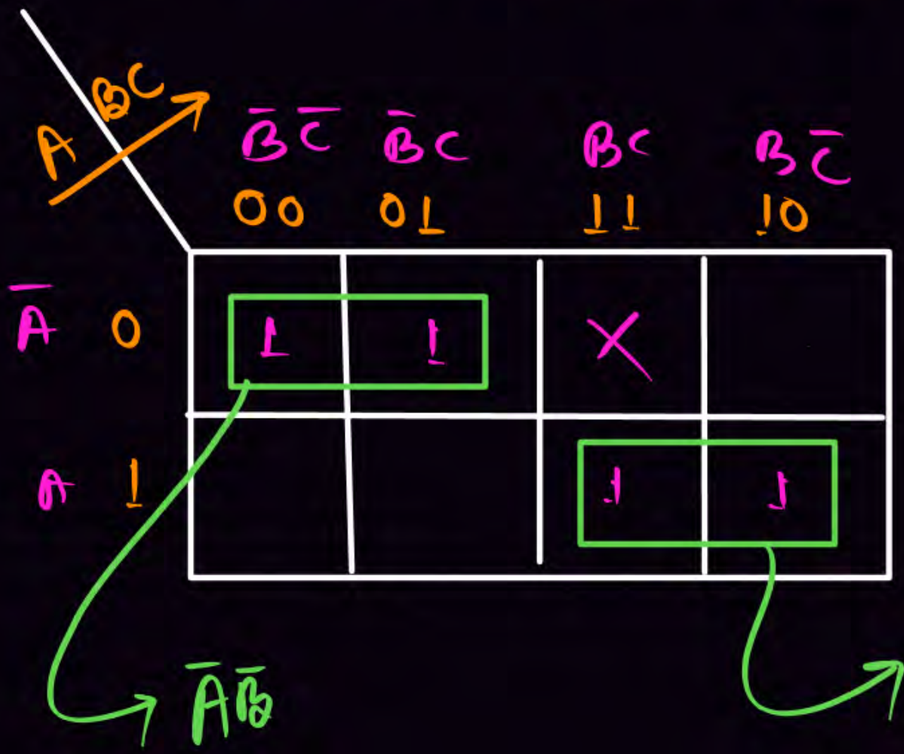
Don't Care Condition

Combination of inputs on which the output may or may not depends are called don't care condition.

$$f(A,B) = \bar{A}B + AB$$

Q $f(A,B,C) = \Sigma m(0,1,6,7) + \Sigma d(3)$

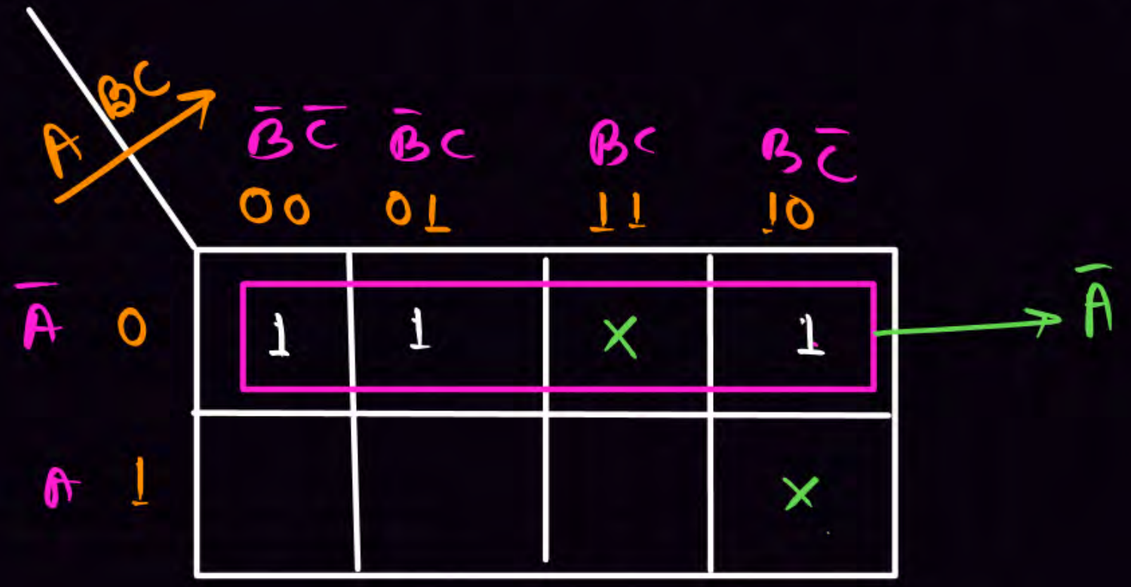
↳ don't care



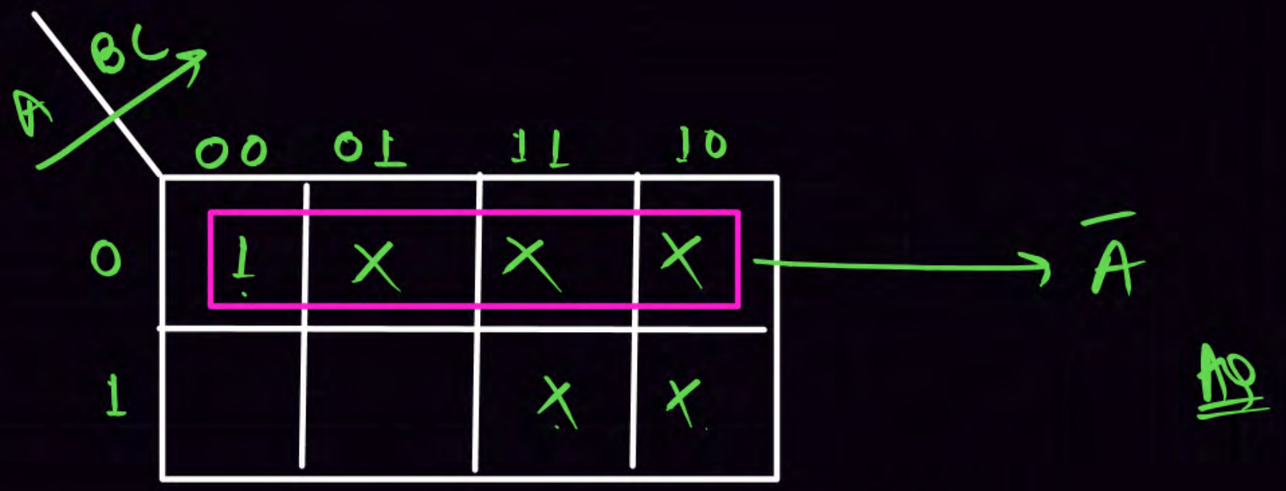
$= \bar{A}\bar{B} + AB$

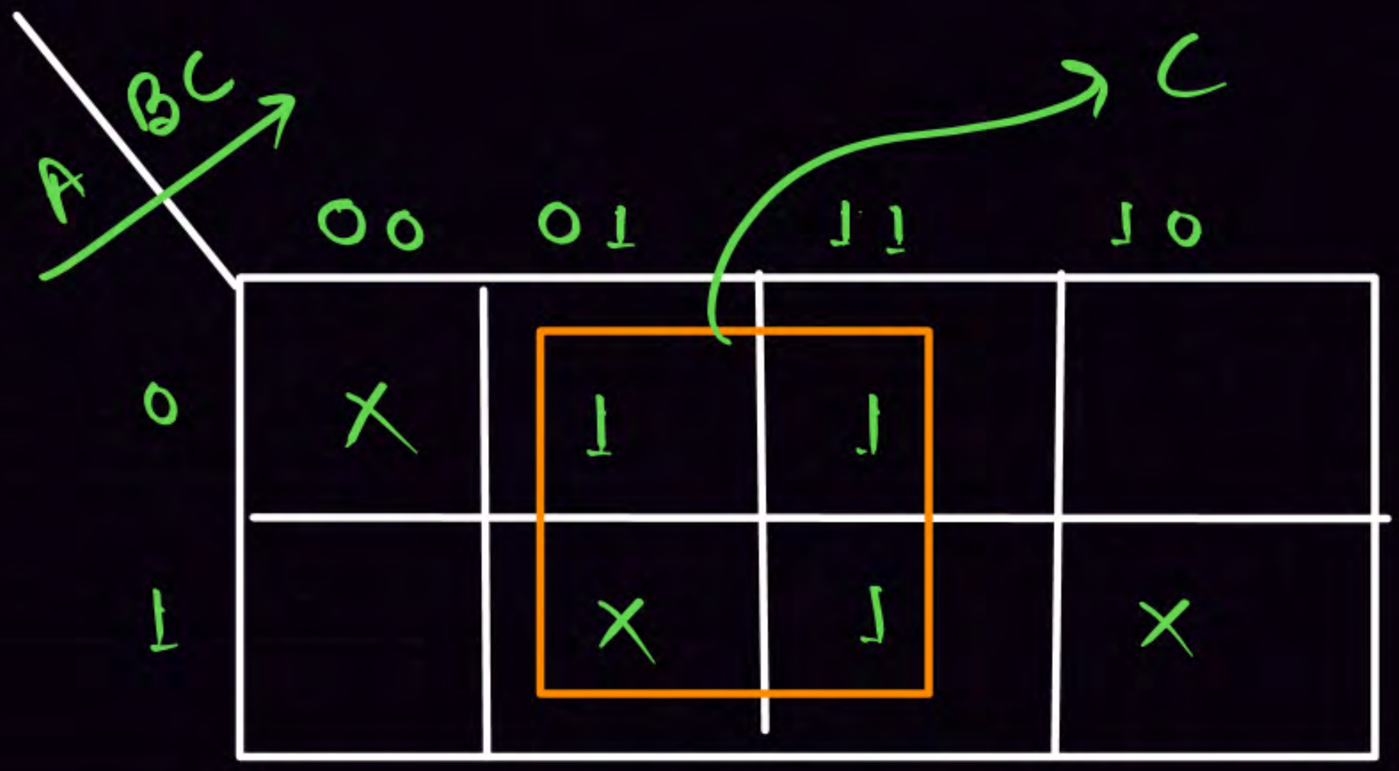
Ans

Q $f(A,B,C) = \Sigma m(0,1,2) + \Sigma d(3,6)$



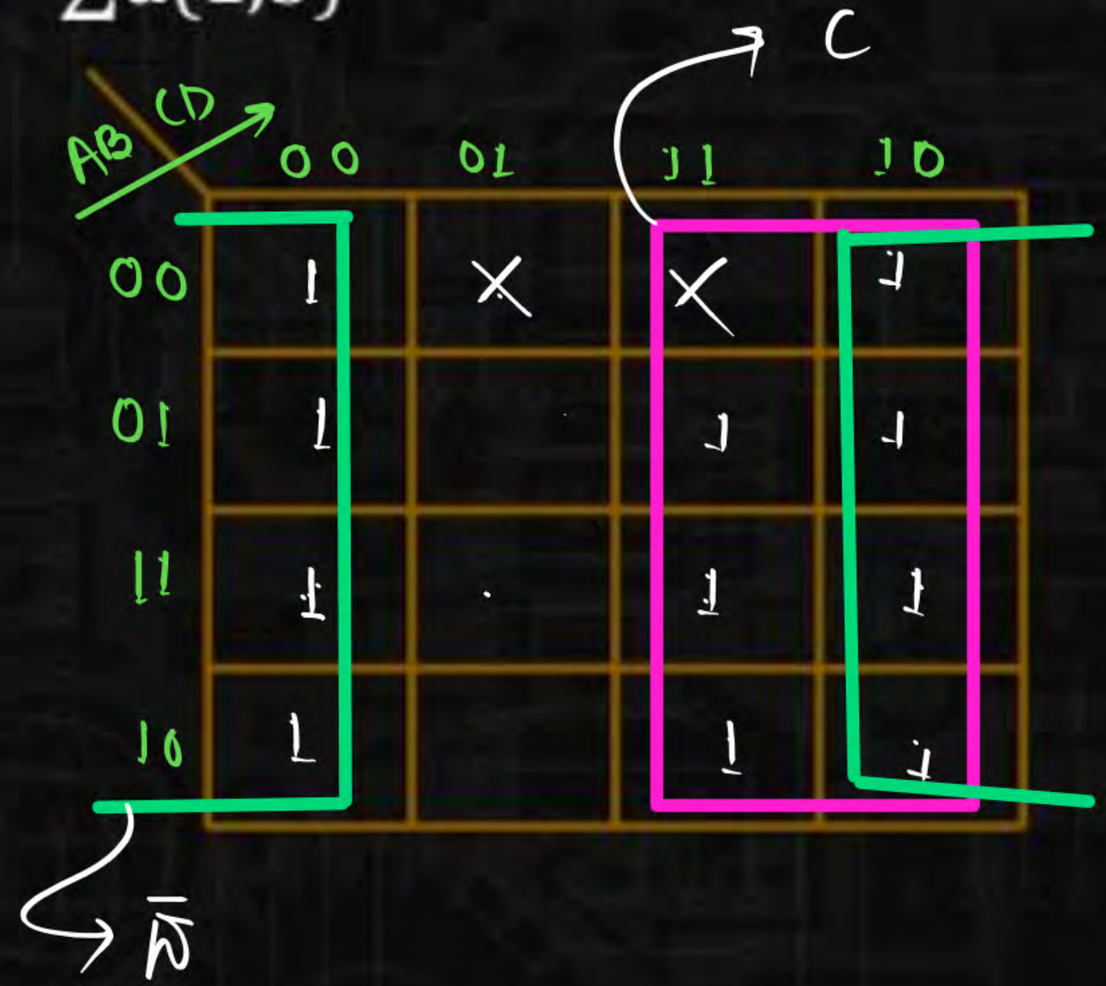
Ans = $\bar{A}$


A
BC
00
01
11
10
0
1
1
X
X
X
X
X
$\bar{A}$



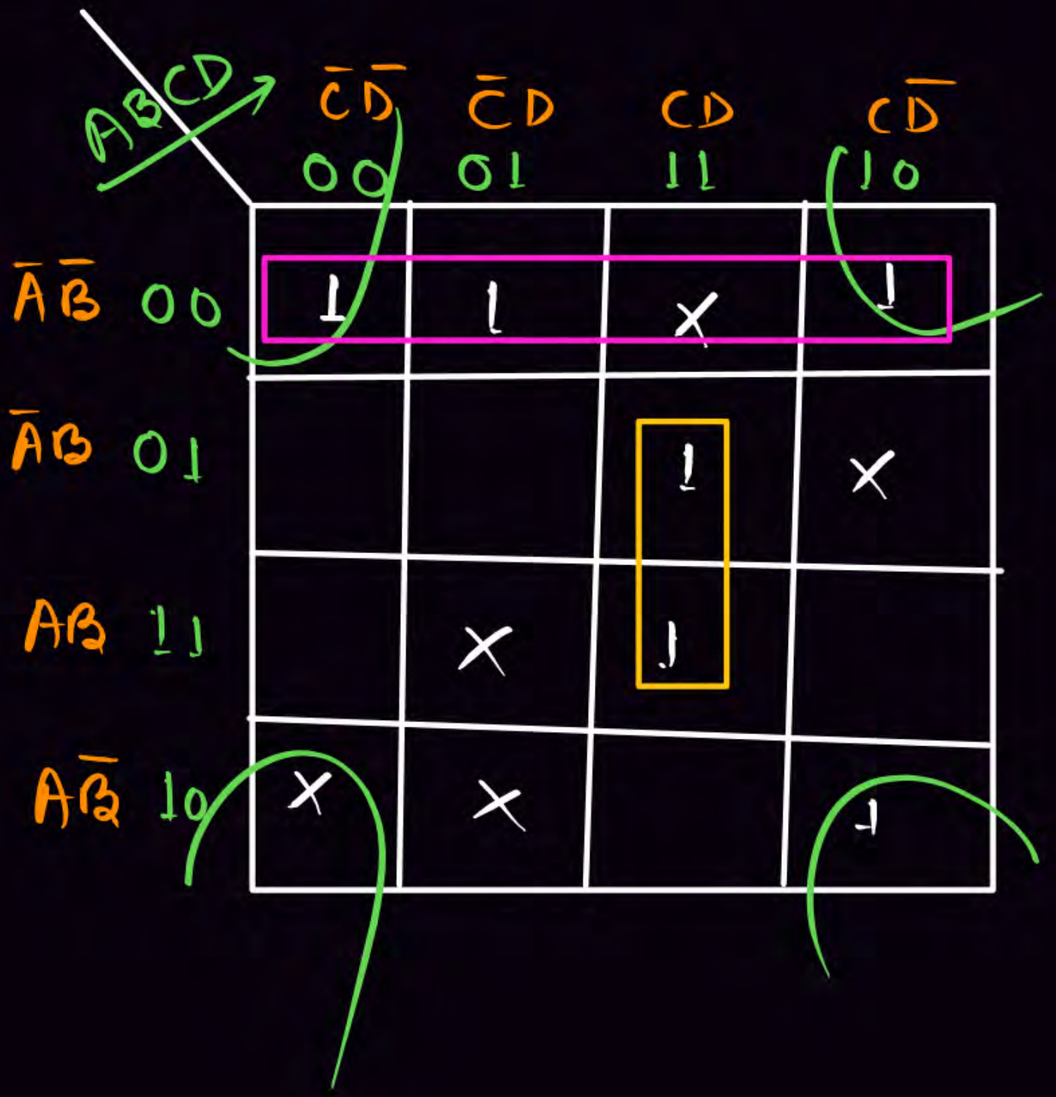
Ans = C

Q.15 $f(A,B,C,D) = \sum m(0, 2, 4, 6, 7, 8, 10, 11, 12, 14, 15) + \sum d(1,3)$



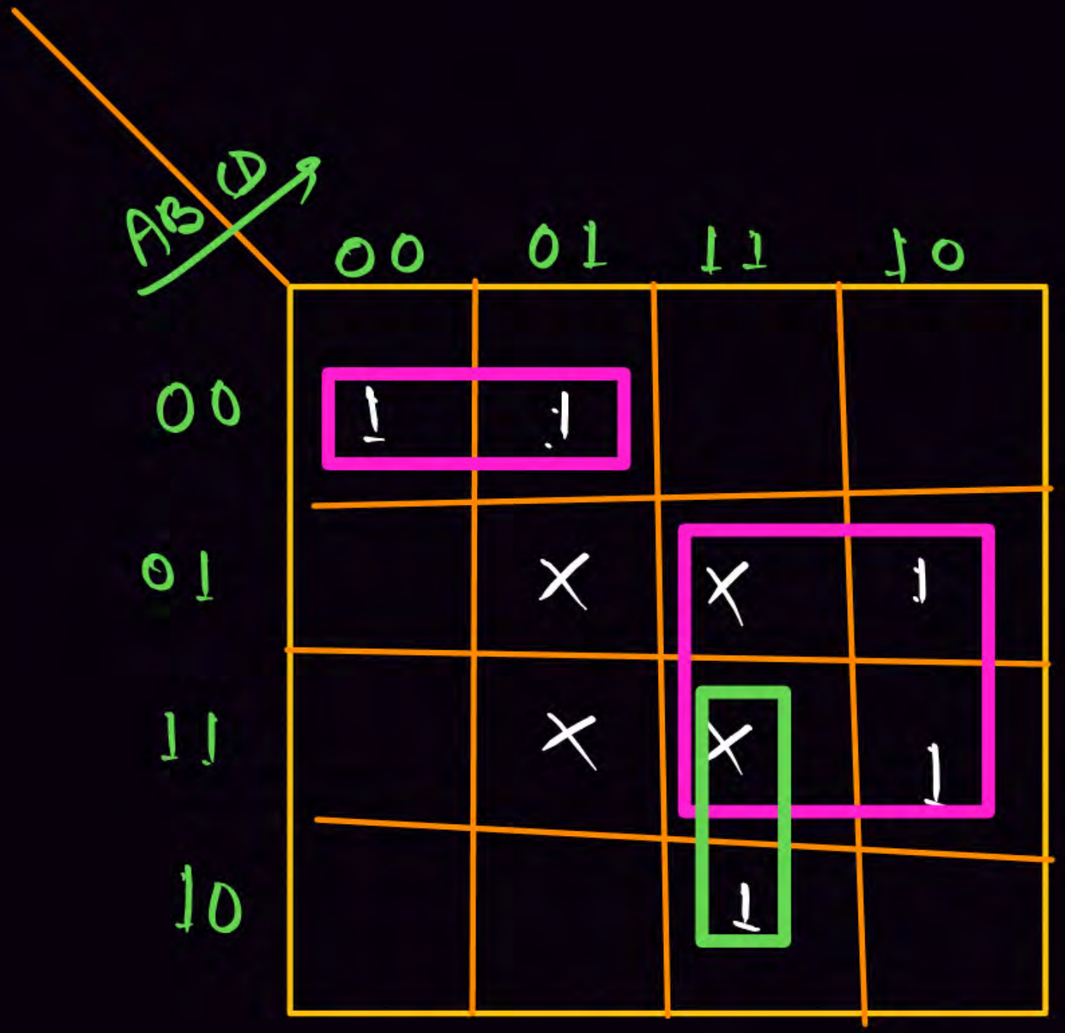
$C + \bar{D}$

Ans



$= \bar{A}\bar{B} + \bar{B}\bar{D} + BCD$

Ans



$\bar{A}\bar{B}\bar{C} + BC + ACD$

K Map - Basics

Discussion


THANK YOU GW
SOLDIERS !