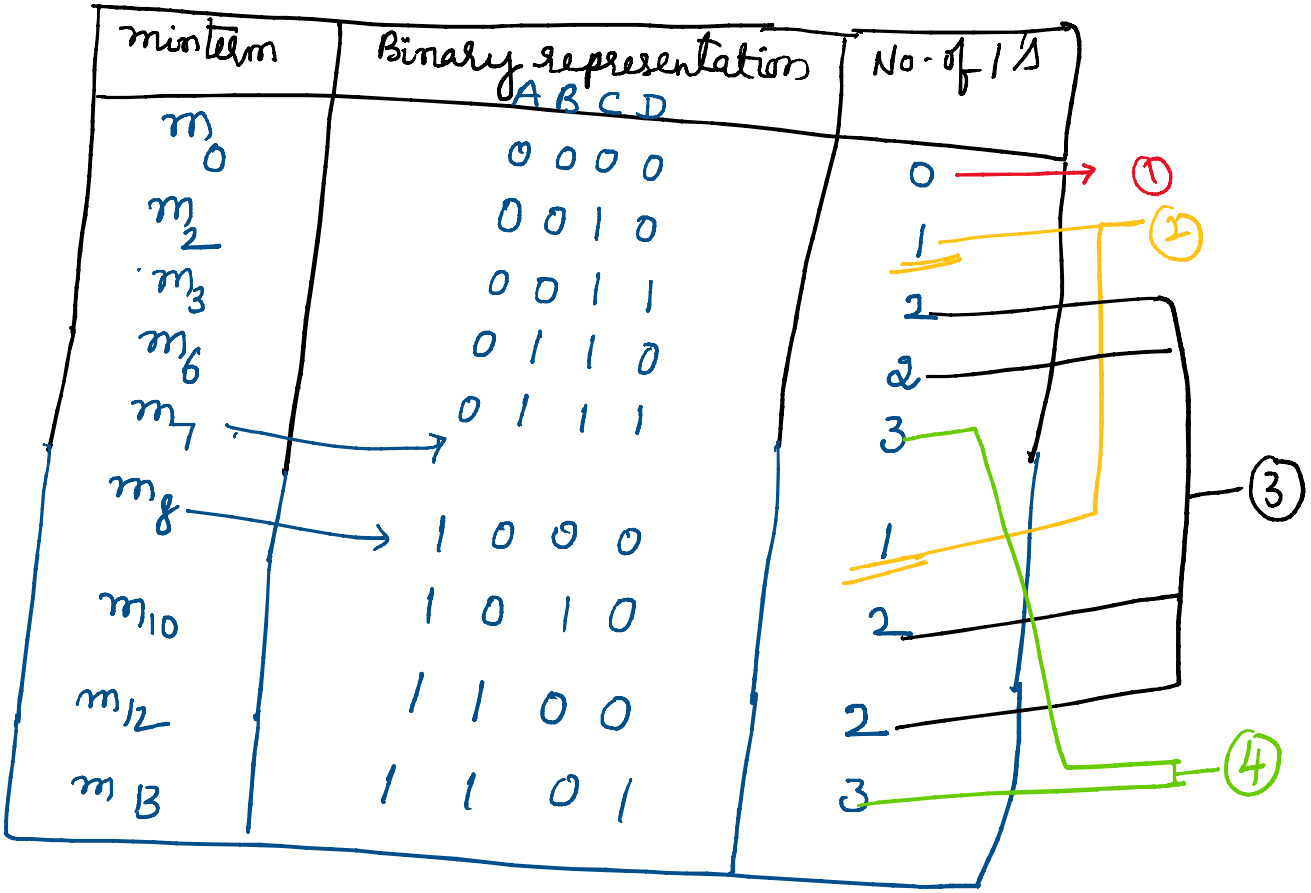
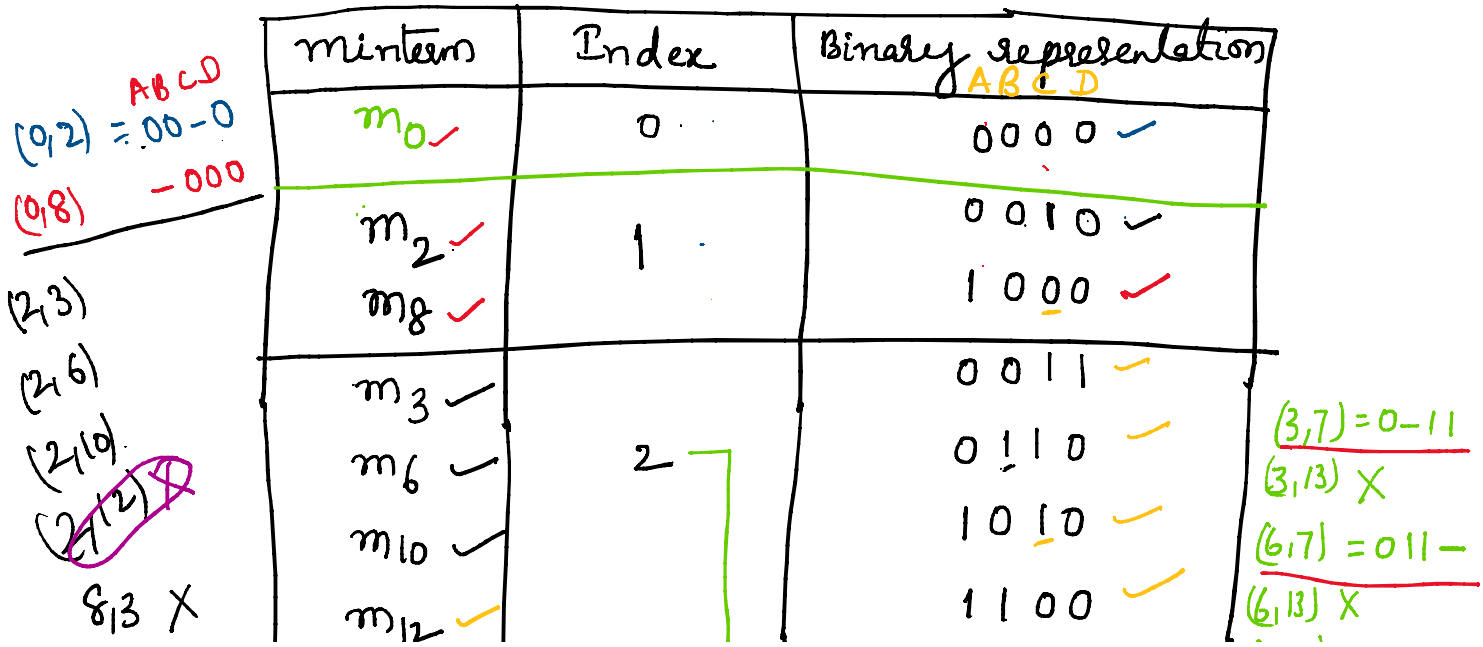
Quine Mc Cluskey (Tabulation)

$f(A,B,C,D) = \Sigma m(0,2,3,6,7,8,10,12,13)$



Step 1 − Arrange the given min terms in an ascending order and make the groups based on the number of ones present in their binary representations.



	m_{12} ✓		1 1 0 0 ✓
	m_7 ✓	3	0 1 1 1
	m_{13} ✓		1 1 0 1

8,13 X
8,16 X
8,10 10-0
8,12 1-00

(6,13) X
(10,7) X
(10,13) X
(12,7) X
(12,13) 110-

Step 2 − Compare the min terms present in successive groups. If there is a change in only one-bit position, then take the pair of those two min terms. Place this symbol '_' in the differed bit position and keep the remaining bits as it is.

Minterm Group	Binary representation A B C D
(0,2) ✓	0 0 − 0
(0,8) ✓	− 0 0 0
(2,3) ✓	0 0 1 −
(2,6) ✓	0 − 1 0
(2,10) ✓	− 0 1 0
8,10 ✓	1 0 − 0
8,12	1 − 0 0 → $A\bar{C}\bar{D}$ → ①
(3,7) ✓	0 − 1 1
6,7 ✓	0 1 1 −
12,13	1 1 0 − → $AB\bar{C}$ → ②

Minterm Group	Binary representation A B C D
(0,2, 8,10)	− 0 − 0 } $\bar{B}\bar{D}$ → ③
(0,8,2,10)	− 0 − 0
2,3,6,7	0 − 1 − } $\bar{A}C$ → ④
2,6,3,7	0 − 1 −

Step 3 − Repeat step2 with newly formed terms till we get all prime implicants.

Prime implicants chart

Prime implicants	0 ✓	2 ✓	3 ✓	6 ✓	7 ✓	8 ✓	10 ✓	12 ✓	13 ✓
(8,12) 1−00						X		X	
(12,13) 110− ✓								X	(X)

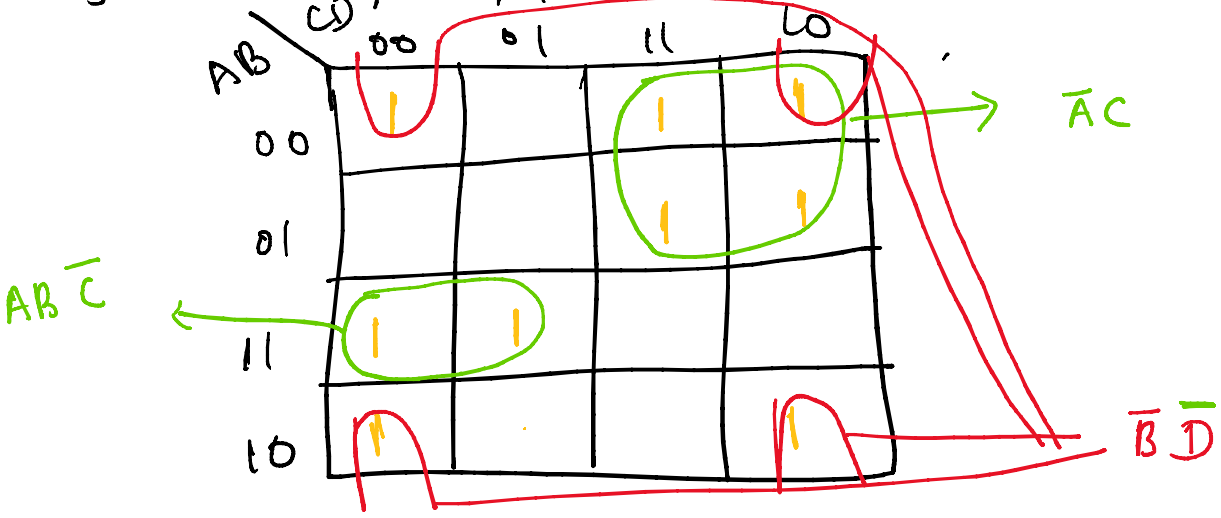
(12,13)	1 1 0 –										X	X	
(0,2,8,10)	–0–0	X	X					X	X				
(2,3,6,7)	0–1–		X	X	X	X							

essential prime implicants

$f = (12,13) + (0,2,8,10) + (2,3,6,7)$

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

$f = \Sigma m(0,2,3,6,7,8,10,12,13)$



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

③ $f(A,B,C,D) = \Sigma m(0,1,2,5,7,8,9,10,13,15)$ ✓

Using Quine Mc clusky method

(8) Tabulation method.