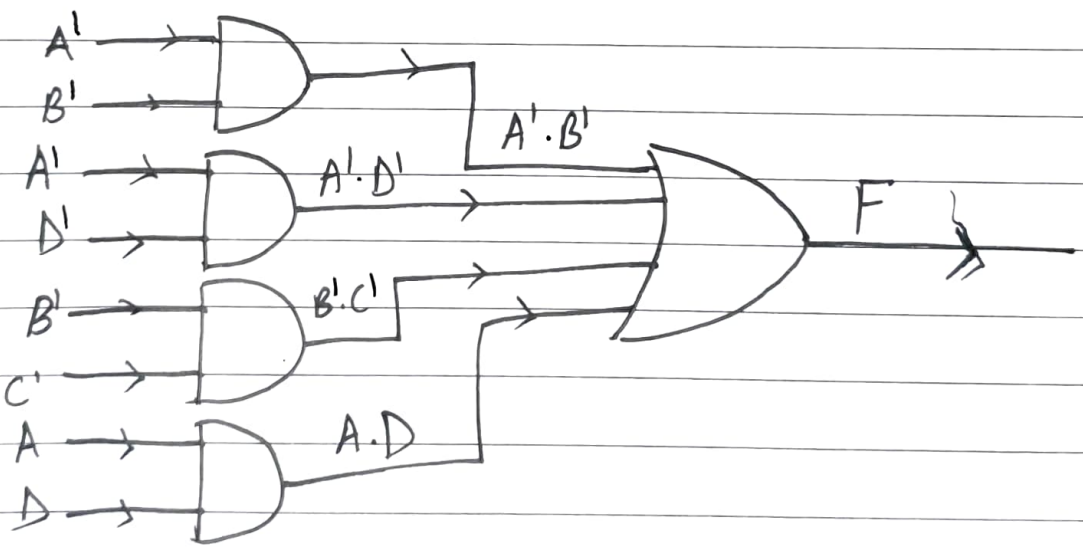
NAME: Mudit Arukia

REG NO. : 20BRS1131

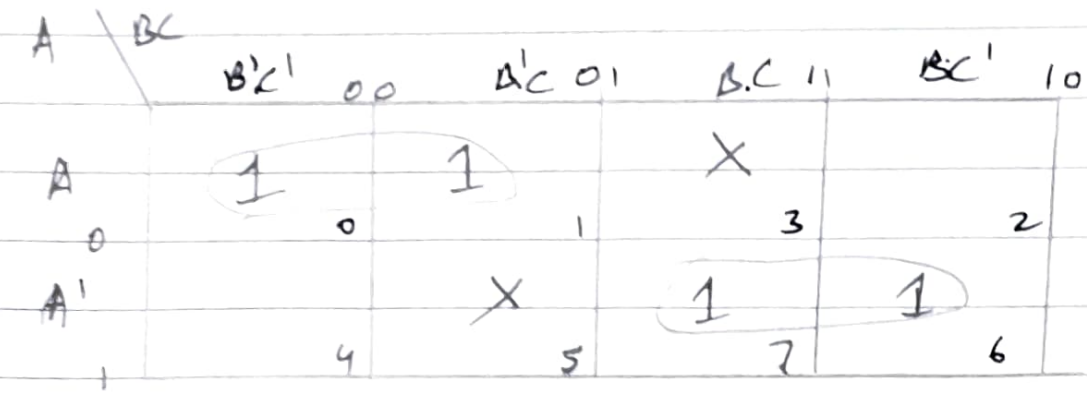
1. $F(A, B, C, D) = \Sigma_m(1, 3, 4, 6, 8, 9, 11, 13, 15) + \Sigma d(0, 2, 14)$

AB \ CD	$C'\cdot D'$ 00	$C'\cdot D$ 01	$C\cdot D$ 11	$C\cdot D'$ 10
$A'\cdot B'$ 00	X (0)	1 (1)	1 (3)	X (2)
$A'\cdot B$ 01	1 (4)	(5)	(7)	1 (6)
$A\cdot B$ 11	(12)	1 (13)	1 (15)	X (14)
$A\cdot B'$ 10	1 (8)	1 (9)	1 (11)	(10)

$F(A, B, C, D) = A'\cdot B' + A'\cdot D' + B'\cdot C' + A\cdot D$

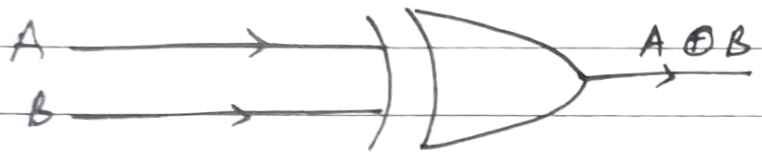


2 $F(A, B, C) = \Sigma m(0, 1, 6, 7) + \Sigma d(3, 5)$

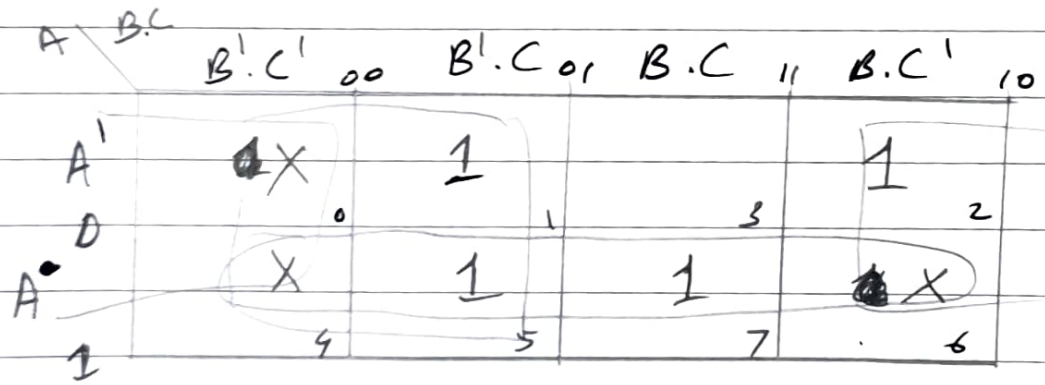


$F(A, B, C) = A'.B + A.B'$

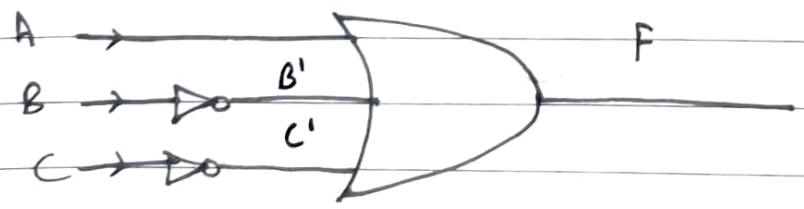
$= A \oplus B$



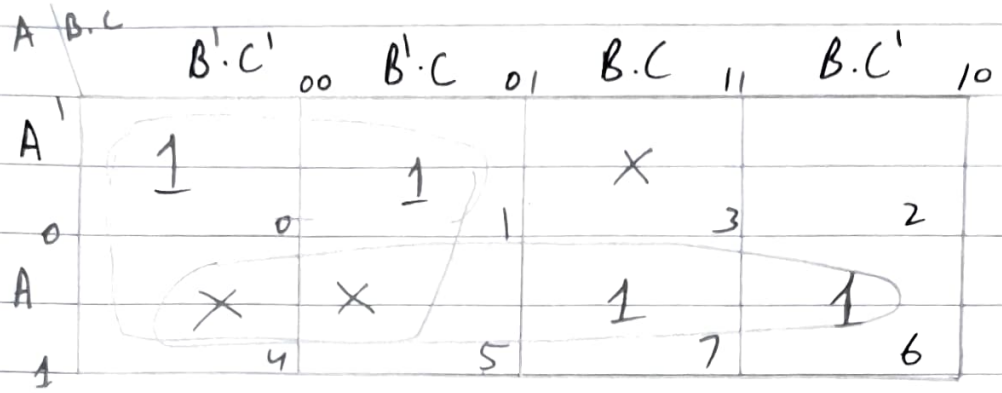
3 $F(A, B, C) = \Sigma m(1, 2, 5, 7) + \Sigma d(0, 4, 6)$



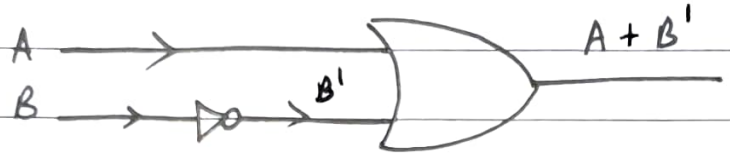
$F(A, B, C) = A + B' + C'$



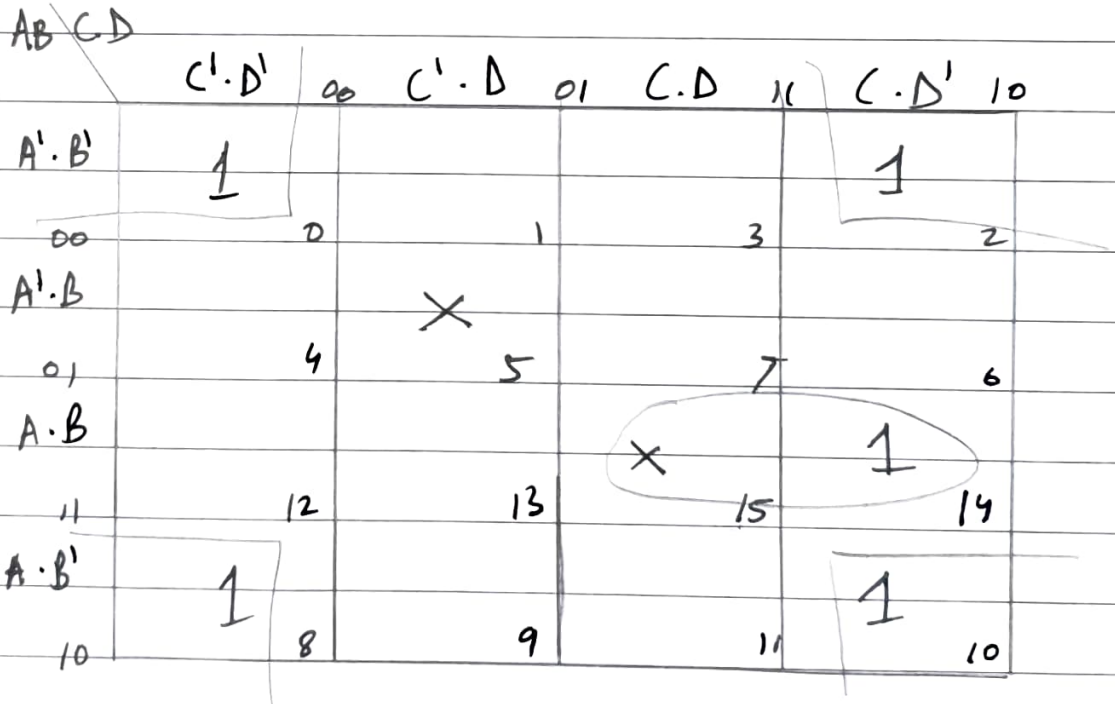
4. $F(A, B, C) = \Sigma m(0, 1, 6, 7) + \Sigma d(3, 4, 5)$



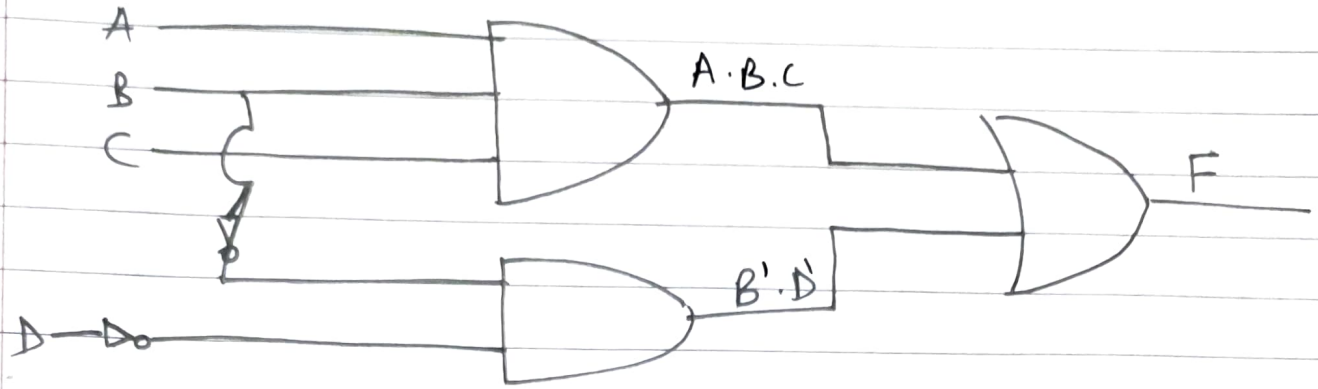
$F(A, B, C) = A + B'$



5. $F(A, B, C, D) = \Sigma m(0, 2, 8, 10, 14) + \Sigma d(5, 15)$.



$F(A, B, C, D) = A \cdot B \cdot C + B' \cdot D'$



6. $F = A'.B'.C' + A'.B'.C + A.B'.C' + A.B'.C$

Index		First list		Second list		Third list	
0	0	0 0 0		0,1	0 0 –	0,1,4,5	– 0 –
1	1	0 0 1		0,4	– 0 0	0,4,1,5	– 0 –
	4	1 0 0		1,5	– 0 1		
2	5	1 0 1		4,5	1 0 –		

$\Rightarrow F = \overline{B}$

7 $F(A, B, C, D) = \Sigma(0, 1, 2, 3, 5, 7, 8, 10, 12, 13, 15)$

$= \Sigma(0000, 0001, 0010, 0011, 0101, 0111, 1000, 1010, 1100, 1101, 1111)$

Index	First list		Second list		Third list	
0	0	0000	0,1	000−	0,1,2,3	00 −−
	1	0001	0,2	00−0	0,2,1,3	00 −−
1	2	0010	0,8	−000	0,2,8,10	−0−0
	8	1000	1,3	00−1	0,8,2,10	−0−0
	3	0011	1,5	0−01	1,3,5,7	0−−1
2	5	0101	2,3	001−	1,5,3,7	0−−1
	10	1010	2,10	−010	5,7,13,15	−1−1
	12	1100	8,10	10−0	5,13,7,15	−1−1
3	7	0111	8,12	1−00 ←		
	13	1101	3,7	0−11		
4	15	1111	5,7	01−1		
			5,13	−101		
			12,13	110− ←		
			7,15	−111		
			13,15	11−1		

Prime implicants = $A'.B' + B'.D' + A'.D + B.D + A.C'.D' + A.B.C'$

P.I.	Minterms	0	1	2	3	5	7	8	10	12	13	15
$A'.B'$	0,1,2,3	×	×	×	×							
$B'.D'$	0,2,8,10	×		×				×	(×)			
$A'.D$	1,3,5,7		×		×	×	×					
$B.D$	5,7,13,15					×	×				×	(×)
$A.C'.D'$	8,12							×		×		
$A.B.C'$	12,13									×	×	

$$\therefore F = \overline{B} \cdot \overline{D} + B \cdot D + \overline{A} \cdot \overline{B} + A \cdot \overline{C} \cdot \overline{D}$$