

$$* F(x, y, z) = \prod (0, 2, 4, 5)$$

$$F' = \prod (1, 3, 6, 7)$$

$$F' = M_1 \cdot M_3 \cdot M_6 \cdot M_7$$

$$(F')' = (M_1 \cdot M_3 \cdot M_6 \cdot M_7)'$$

$$= m_1' + m_3' + m_6' + m_7'$$

$$F = \sum (1, 3, 6, 7)$$

Maxterm to minterm conversion

$$\textcircled{1} F(x, y, z) = \prod (0, 3, 6, 7)$$

$$F' = \prod (1, 2, 4, 5)$$

$$= M_1 \cdot M_2 \cdot M_4 \cdot M_5$$

$$(F')' = \overline{M_1 \cdot M_2 \cdot M_4 \cdot M_5}$$

$$= m_1 + m_2 + m_4 + m_5$$

$$F = \sum (1, 2, 4, 5)$$

$$\textcircled{2} F(a, b, c, d) = \prod (0, 1, 2, 3, 4, 6, 12)$$

$$F' = \prod (5, 7, 8, 9, 10, 11, 13, 14, 15)$$

$$F' = m_5 \cdot m_7 \cdot m_8 \cdot m_9 \cdot m_{10} \cdot m_{11} \cdot m_{13} \cdot m_{14} \cdot m_{15}$$

$$(F')' = m_5 \cdot m_7 \cdot m_8 \cdot m_9 \cdot m_{10} \cdot m_{11} \cdot m_{13} \cdot m_{14} \cdot m_{15}$$

$$= \sum (5, 7, 8, 9, 10, 11, 13, 14, 15)$$

maxterm to minterm conversion

$$\textcircled{1} F(x, y, z) = \prod (0, 3, 4, 7)$$

$$F = \prod (1, 2, 5, 6)$$

$$= m_1 \cdot m_2 \cdot m_5 \cdot m_6$$

$$(F)' = m_0 + m_3 + m_4 + m_7$$

$$F = \sum (1, 2, 5, 6)$$

$$\textcircled{2} F(x, y, z) = \sum (1, 3, 7)$$

$$F' = \sum (0, 2, 4, 5, 6)$$

$$(x+y) = m_0 + m_2 + m_4 + m_5 + m_6$$

$$(F)' = m_0 + m_2 + m_4 + m_5 + m_6$$

$$F = m_0 \cdot m_2 \cdot m_4 \cdot m_5 \cdot m_6$$

$$F = \Pi (0, 2, 4, 5, 6)$$

$$\textcircled{3} F(A, B, C, D) = \sum (0, 2, 6, 11, 13, 14)$$

$$F' = \sum \cancel{m_1 + m_3} + 1, 3, 4, 5, 7, 8, 9, 10, 12, 15$$

$$= m_1 + m_3 + m_4 + m_5 + m_7 + m_8 + m_9 + m_{10} + m_{12} + m_{15}$$

$$(F)' = m_1 + m_3 + m_4 + m_5 + m_7 + m_8 + m_9 + m_{10} + m_{12} + m_{15}$$

$$F = m_1 \cdot m_3 \cdot m_4 \cdot m_5 \cdot m_7 \cdot m_8 \cdot m_9 \cdot m_{10} \cdot m_{12} \cdot m_{15}$$

$$F = \Pi (1, 3, 4, 5, 7, 8, 9, 10, 12, 15)$$

वि. प्र :- minterm $\rightarrow x + \bar{x} = 1$ अवकाश

Maxterm $\rightarrow x \cdot x' = 0$ व्याप्त काल

Minterm to maxterm Conversion

① $F(x, y, z) = x + y'z$

$$x + y'z = x \cdot (y + y') + y'z \cdot (x + x')$$

$$= xy + xy' + xy'z + x'y'z$$

$$= xy \cdot (z + z') + xy' \cdot (z + z') + xy'z + x'y'z$$

$$= xyz + xy\bar{z} + xy'z + xy'\bar{z} + xy'z + x'y'z$$

$$= xyz + xy\bar{z} + xy'z + xy'\bar{z} + x'y'z$$

$$= 111 + 110 + 101 + 100 + 001$$

$$= m_7 + m_6 + m_5 + m_4 + m_1$$

$$= m_1 + m_4 + m_5 + m_6 + m_7$$

$$F = \sum (1, 4, 5, 6, 7)$$

$$F' = \sum (0, 2, 3)$$

$$F' = m_0 + m_2 + m_3$$

$$(F')' = (m_0 + m_2 + m_3)'$$

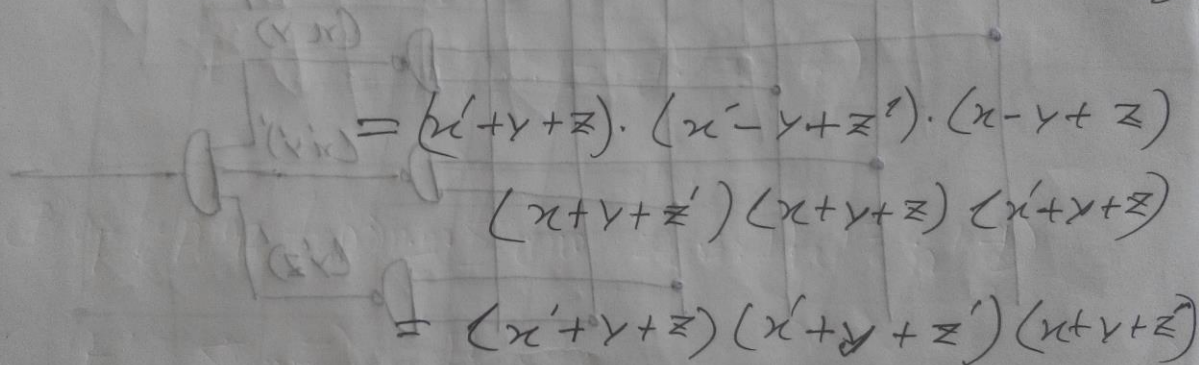
$$F = m_0' \cdot m_2' \cdot m_3'$$

$$F = M_0 \cdot M_2 \cdot M_3$$

$$= \prod (0, 2, 3)$$

Maxterm:

$$\begin{aligned}
 F(x, y, z) &= xy + x'z \\
 &= (xy + x') \cdot (xy + z) \\
 &= (x + x')(y + x')(x + y)(y + z) \\
 &= (x' + y)(x + y)(y + z) \\
 &= (x' + y + z \cdot z')(x + y + z \cdot z')(y + z + x \cdot x')
 \end{aligned}$$



$$\begin{aligned}
 &= (x' + y + z) \cdot (x' - y + z') \cdot (x - y + z) \\
 &\quad (x + y + z') (x + y + z) (x' + y + z) \\
 &= (x' + y + z)(x' + y + z')(x + y + z)
 \end{aligned}$$

$$= M_4 \cdot M_5 \cdot M_0 \cdot M_1$$

$$= M_0 \cdot M_1 \cdot M_4 \cdot M_5$$

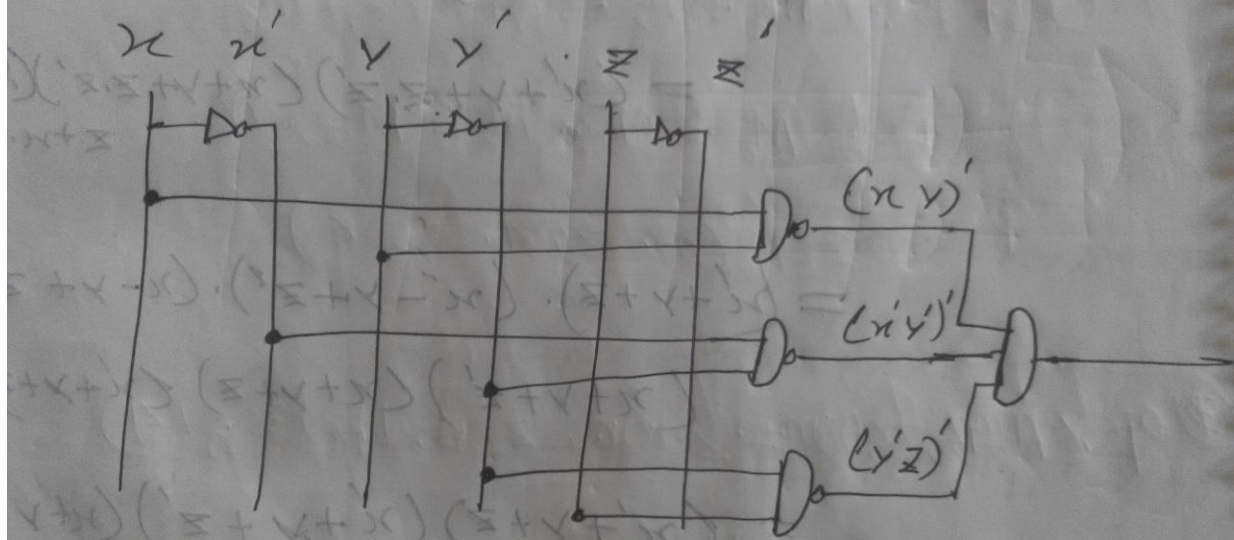
$$= \Pi(0, 1, 4, 5)$$

(11)

$$F = xy + x'y' + y'z$$

$$= (xy + x'y' + y'z)'$$

$$= (xy)' \cdot (x'y')' \cdot (y'z)'$$



minimization

$$* xy + x'z + yz$$

$$= xy \cdot 1 + x'z \cdot 1 + yz \cdot 1$$

$$= xy(z + z') + x'z(y + y') + yz(x + x')$$

$$= xyz + xy z' + x'zy + x'y'z + xyz + x'y z$$

$$= xyz + x'y z + xyz' + x'y'z$$

$$= x'z(y + y') + xy(z + z')$$

$$= x'z + xy$$

$$0 \rightarrow 0000$$

$$1 \rightarrow 0001$$

$$2 \rightarrow 0010$$

$$3 \rightarrow 0011$$

$$4 \rightarrow 0100$$

$$5 \rightarrow 0101$$

$$6 \rightarrow 0110$$

$$7 \rightarrow 0111$$

$$8 \rightarrow 1000$$

$$9 \rightarrow 1001$$

$$10 \rightarrow 1010$$

$$11 \rightarrow 1011$$

$$12 \rightarrow 1100$$

$$13 \rightarrow 1101$$

$$14 \rightarrow 1110$$

$$15 \rightarrow 1111$$

Tr. Table x, y, z

$$x' = y' = z' = 0$$

$$x = y = z = 1$$

$$w' = x' = y' = z' = 0$$

$$w = x = y = z = 1$$

19-08-17

Boolean Function using minterm and maxterm.

$$\textcircled{1} F(A, B, C) = A'(B + C')$$

$$AB + A'C'$$

$$AB(C + C') + A'C'(B + B')$$

$$= A'BC + A'BC' + A'B'C' + A'B'C'$$

$$= A'BC + A'BC' + A'B'C'$$

$$= 011 + 010 + 000$$

$$= m_3 + m_2 + m_0$$

$$= m_0 + m_2 + m_3$$

$$= \Sigma(0, 2, 3)$$

	C	0	1	1	0
A	B	0	1	1	0
0		1		1	1
1		1	1	1	0

$$\begin{array}{r} 011 \\ 010 \\ \hline A'B \end{array} \quad \begin{array}{r} 000 \\ 010 \\ \hline A'C' \end{array}$$

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

$$(2) \quad F(A, B, C) = (A+B)C'$$

$$= AC' + BC'$$

$$= AC'(B+B') + BC'(A+A')$$

$$= ABC' + AB'C' + ABC' + A'B'C'$$

$$(110) \rightarrow A + (010) \rightarrow B = ABC' + AB'C' + A'B'C'$$

$$= m_6 + m_4 + m_2$$

$$= m_2 + m_4 + m_6$$

$$000 + 010 + 110 = \sum (2, 4, 6)$$

$$011 + 101 + 111 =$$

$$101 + 111 + 110 =$$

$$(0, 1, 2) =$$

	0	1
0	0	1
1	1	0

$$\begin{array}{r} 000 \\ 010 \\ \hline 010 \\ A'B \end{array} \quad \begin{array}{r} 110 \\ 010 \\ \hline 010 \\ BA \end{array}$$

$$A'B + BA = 1$$

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

$$= A'D + BD + B'D$$

$$= A'D(B+B') + BD(A+A') + B'D(A+A')$$

$$= A'BD + A'B'D + ABD + A'BD + A'BD + A'B'D$$

$$= A'BD(C+C') + A'B'D(C+C') + ABD(C+C') +$$

$$A'BD(C+C') + A'BD(C+C') + A'B'D(C+C')$$

$$= A'BCD + A'BC'D + A'BCD + A'BC'D + A'BC'D + ABCD + ABC'D$$

$$+ A'BCD + A'BC'D + ABCD + ABC'D + A'BCD + A'BC'D$$

$$= A'BCD + A'BC'D + A'BCD + A'BC'D + ABCD + ABC'D$$

$$+ ABCD + ABC'D + ABCD + ABC'D$$

$$= m_2 + m_3 + m_3 + m_1 + m_{15} + m_{13} + m_{11} + m_9$$

$$= m_1 + m_3 + m_5 + m_7 + m_9 + m_{11} + m_{13} + m_{15}$$

$$= \Sigma(1, 3, 5, 7, 9, 11, 13, 15)$$

$$\textcircled{1} \quad \square F(x, y, z) = 1$$

$$= x + x'$$

$$= x \cdot (y + y') + x' \cdot (y + y')$$

$$= xy + xy' + x'y + x'y'$$

$$= xy(z + z') + xy'(z + z') + x'y(z + z')$$

$$+ x'y'(z + z')$$

$$= \begin{matrix} xy & z & + & xy & z' & + & xy' & z & + & xy' & z' & + & x'y & z & + & x'y & z' & + & x'y' & z & + & x'y' & z' \\ 11 & 1 & & 11 & 0 & & 10 & 1 & & 10 & 0 & & 01 & 1 & & 01 & 0 & & 00 & 1 & & 00 & 0 \end{matrix}$$

$$= m_7 + m_6 + m_5 + m_4 + m_3 + m_2 + m_1 + m_0$$

$$= m_0 + m_1 + m_2 + m_3 + m_4 + m_5 + m_6 + m_7$$

$$= \sum (0, 1, 2, 3, 4, 5, 6, 7)$$

$$= \sum (z, 1, 1, 1, 1, 1, 1, 1)$$

②

$$\square F(A, B, e) = (A+B) \cdot (B'+e)$$

$$= A'B' + BB' + Ae + Be$$

$$= A'B'(e+e') + A'e(B+B') + Be(A+A')$$

$$= A'B'e + A'B'e' + ABe + A'B'e + AB'e + A'Be$$

$$= \underset{0,0,1}{A'B'e} + \underset{0,0,0}{A'B'e'} + \underset{0,1,1}{A'Be} + \underset{1,1,1}{AB'e}$$

$$= m_0 + m_1 + m_3 + m_7$$

$$= \Sigma(0, 1, 3, 7)$$

$$\square F(w, x, y, z) = y'z + wxy' + wxz' + w'x'z$$

$$= y'z(x+x') + wxy'(z+z') + wxz'(y+y') + w'x'z(y+y')$$

$$= xy'z + x'y'z + wxy'z + wx'y'z + wxy'z' + wx'y'z' + w'x'y'z + w'x'y'z'$$

$$= wxy'z + w'xy'z + wxy'z + wxy'z' + wxy'z' + w'xy'z' + w'x'y'z + w'x'y'z'$$

$$= \cancel{wxy'z} + \cancel{w'xy'z} + \cancel{wxy'z} + \cancel{wxy'z'} + \cancel{wxy'z} + \cancel{w'x'y'z} + \cancel{w'x'y'z}$$

$$= wxy'z + w'xy'z + wxy'z' + wxy'z' + wxy'z'' + wxy'z'' + wxy'z''' + wxy'z'''$$

$$= m_6 + m_{10} + m_{12} + m_{14} + m_{12} + m_3 + m_1$$

$$= m_1 + m_3 + m_6 + m_{10} + m_{12} + m_{14}$$

$$= \sum (1, 3, 6, 10, 12, 14)$$

$$= \sum (0, 1, 3, 5)$$

$$F(w, x, y, z) = \sum (1, 3, 6, 10, 12, 14)$$

$$= \sum (1, 3, 6, 10, 12, 14)$$

$$= \sum (1, 3, 6, 10, 12, 14)$$

$$= \sum (1, 3, 6, 10, 12, 14)$$

$$= \sum (1, 3, 6, 10, 12, 14)$$