Minterms and Maxterm

- Minterms:
  - Each fundamental product in the SOP from is called as minterms.
  - Each individual term in the **Standerd** or **Canonical** SOP from as called as minterm
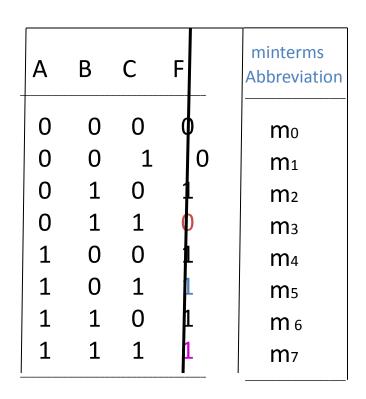
Example :

- Calculate the minterms forms for the given table

$$F(A\,B\,C) = \overline{A}\,B\,\overline{C} + A\,\overline{B}\,\overline{C} + A\,\overline{B}\,C + A\,B\,\overline{C} + A\,B\,C$$

$$= \quad m_2 \qquad m_4 \qquad m_5 \qquad m_6 \qquad m_7$$

$$F(A\,B\,C) = \sum m\,(2, 4, 5, 6, 7\,)$$

A	B	C	F	minterms Abbreviation
0	0	0	0	m_0
0	0	1	0	m_1
0	1	0	1	m_2
0	1	1	0	m_3
1	0	0	1	m_4
1	0	1	1	m_5
1	1	0	1	m_6
1	1	1	1	m_7

- Maxterms:
    - Each fundamental sum in the POS from is called as maxterms.
    - Each individual term in the **Standerd** or **Canonical** POS from as called as minterm

Example :

- Calculate the minterms forms for the given table

$F(A\ B\ C)\ =\ (\overline{A} + \overline{B} + \overline{C})\quad(\overline{A} + B + C)\quad(A + B + C)$

- $\qquad\qquad =\qquad m_0 \qquad\qquad m_1 \qquad\qquad m_3$

A	B	C	F	maxterms Abbreviation
0	0	0	0	m_0
0	0	1	0	m_1
0	1	0	1	m_2
0	1	1	0	m_3
1	0	0	1	m_4
1	0	1	1	m_5
1	1	0	1	m_6
1	1	1	1	m_7

- Example:

convert $\overline{A} + \overline{B}$ to standard minterms and drown truth table

Sol :

$$\overline{A} + \overline{B} = \overline{A}(1) + (1)\overline{B}$$

$$= \overline{A}(B + \overline{B}) + (A + \overline{A})\overline{B}$$

$$= \overline{A}B + \overline{A}\,\overline{B} + A\overline{B} + \overline{A}\,\overline{B}$$

$$= \overline{A}B + \overline{A}\,\overline{B} + A\overline{B}$$

$$F(A\,B) = \sum m\,(0,1,2,)$$

A	B	F
0	0	1
0	1	1
1	0	1
1	1	0

- Example:

convert $\overline{A} + \overline{B}\,C$ to standard minterms and drown truth table

Sol :

$$\overline{A} + \overline{B}\,C = \overline{A}(1)(1) + (1)\overline{B}\,C$$

$$= \overline{A}(B + \overline{B})(C + \overline{C}) + (A + \overline{A})\overline{B}\,C$$

$$F(A\,B\,C) = \sum m\,(0,1,2,3,5)$$

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