SOP (sum of product)

- A sum of product form expression contains product terms (AND terms) which are sum (OR) together, that's why called sum of product.

- Each product terms (AND terms) consists of one or more literals (variables) appearing either in complements or uncomplemented form. E.g. a'b + b'c' + abc

- A product term which contains all the literals (variables) either in complemented or uncomplemented form is called minterm.

- In a n variable function, there will be 2^n minterms.

Binary Representation	Sequence	Minterm	Designation
000	0	a'b'c'	m_0
001	1	a'b'c	m_1
010	2	a'bc'	m_2
011	3	a'bc	m_3
100	4	ab'c'	m_4
101	5	ab'c	m_5
110	6	abc'	m_6
111	7	Abc	m_7

- The result of a product term must always be 1, If a literal is having value 1 then it is ok, but if not, then we complement those which is 0, it to make it 1.

- There is only 1 input sequence of variables for any minterm on which the output is 1, so it represents information.

- Then the sum of all product term(minterm) to from a function, and functions will have value 1, if at least one of the product term(minterm) is 1.

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Canonical logic forms

Either in POS or SOP form it is not essential that all product or sum terms contains all the literals.

Canonical SOP form: - In a sum of product form expression, if each AND term (product term) consists all the literals(variables) appearing either in complements or uncomplemented form. E.g. a'bc + ab'c' + abc. Then the form is said to be canonical SOP.

POS (Product of Sum)

- A product of sum (POS) form of expression contains OR (sum) terms which are AND (product) together, that's why called product of sum expression.

- Each OR term (sum term) consists of one or more literals(variables) appearing either in complemented or uncomplemented form. (a' + b). (b' + c'). (a + c)