

Minterms and Maxterms

Minterms

- A minterm of n variables is a **product** of n literals in which each variable appears exactly once in either true or complimented form (but not both)

ABC	Minterms Designator
000	$A'B'C'$ = m0
001	$A'B'C$ = m1
010	$A'BC'$ = m2
011	$A'BC$ = m3
100	$AB'C'$ = m4
101	$AB'C$ = m5
110	ABC' = m6
111	ABC = m7

A Boolean expression such as: $F = ABC + A'B'C + AB'C$ is expressed as a sum of products. In addition, it may be expressed using the designator representation (or m-notation).

$$F(A,B,C) = m1 + m5 + m7$$

OR

$$F(A,B,C) = \sum m(1, 5, 7)$$

When examining a truth table for a given expression, the minterms correspond to the 1's in F

Maxterms

- A maxterm of n variables is a **sum** of n literals in which each variable appears exactly once in either true or complimented form (but not both)

ABC	Maxterms Designator
000	$A+B+C = M0$
001	$A+B+C' = M1$
010	$A+B'+C = M2$
011	$A+B'+C' = M3$
100	$A'+B+C = M4$
101	$A'+B+C' = M5$
110	$A'+B'+C = M6$
111	$A'+B'+C' = M7$

A Boolean expression such as: $F = (A+B+C)(A'+B'+C)(A+B'+C)$ is expressed as a product of sums. In addition, it may be expressed using the designator representation (or M-notation).

$$F(A,B,C) = M0M2M6$$

OR

$$F(A,B,C) = \prod M(0, 2, 6)$$

When examining a truth table for a given expression, the maxterms correspond to the 0's in F