

Reading Assignment: Chapter 2 in Logic and Computer Design Fundamentals, 4th Edition by Mano

Complement of a Function

A function F' has the exact opposite truth table as function F .

Example: Find truth table for F and for F' for the function below.

$$F = x \cdot \bar{y} \cdot \bar{z} + \bar{x} \cdot y$$

Canonical and Standard forms

Boolean functions are commonly expressed using the following forms:

- Canonical forms:
 - » Sum of minterms
 - » Product of maxterms
- Standard forms:
 - » Sum of products
 - » Product of sums

Minterm – (also called a *standard product*) A minterm is a term containing all n variables (complemented or uncomplemented) ANDed together.

Example: $f(A,B)$ has 4 possible minterms. List them.

Each minterm represents one n-bit word where:

Primed variable $\equiv 0$

Unprimed variable $\equiv 1$

Minterm designation: for function $f(x,y,z)$ the input combination 000 represents minterm $x'y'z'$ and is designated m_0 .

Example: Show all 8 possible minterms and the shorthand designations for $f(x, y, z)$.

Key Point: A Boolean function F may be represented by a sum (ORed together) of its minterms. They represent the input combinations needed to yield $F = 1$. So minterms represent the 1's in the truth table for F .

$$F = \sum (\text{minterms})$$

Example: Pick a truth table for some function $f(x,y,z)$ and represent f as a sum of minterms.

Maxterm – (also called a *standard sum*) A maxterm is a term containing all n variables (complemented or uncomplemented) ORed together.

Example: $f(A,B)$ has 4 possible maxterms. List them.