**BOOLEAN ALGEBRA**

**Alternative Words**

* **Conjunction – AND (Λ)**
* **Disjunction – OR (V)**
* **Negation – NOT (¬)**

**Logical Expressions**

* We **reduce** Boolean expressions to smaller equations because **small equation** means **lesser** number of **gates** & other components to be used in making of circuit.
* Less number of gates also mean that **less power** will be dissipated from the circuit.

**Boolean Laws**

* **Complement law**
* **Double negation law**

AND laws:-

* **Annulment law: A.0 = 0**
* **Identity property: A.1 = A**
* **Idempotent property: A.A = A**
* **Complement property: A.A’ = 0**

OR laws:-

* **Annulment law: A + 1 = 1**
* **Identity property: A + 0 = A**
* **Idempotent property: A + A = A**
* **Complement property: A + A’ = 1**

**Distributive Laws**

**A + (B.C) = (A+B).(A+C)**

**A.(B+C) = (A.B) + (A.C)**

**Commutative Laws**

**A+B = B+A**

**A.B = B.A**

Associative Law

Associative law using OR:-

A + (B + C) = (A + B) + C

Associative law using AND:-

A . (B . C) = (A . B) . C

Absorption Property

* Properties which help in reduction of Boolean expression to simpler form.

A + (A . B) = A

A . (A + B) = A

Precedence of Logical Operators

|  |  |
| --- | --- |
| Operator | Precedence |
| ! | Highest |
| . | Medium |
| + | Lowest |

De Morgan’s Theorem