Propositions and Rules of Boolean Algebra

There is an order of precedence of operations, just as there is in ordinary arithmetic. In Boolean algebra, it is as follows:

Brackets (evaluated first), then NOT, then AND, then OR.

These four basic rules are all provable:

1: **Commutative Proposition**

A.B = B.A	*A and B = B and A*
A+B = B+A	*A or B = B or A*

2: **Distributive Proposition**

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

3: **Identity Proposition**

A+0 = A	*A or 0 = A*
A+1 = 1	*A or 1 = 1*
A.1 = A	*A and 1 = A*
A.0 = 0	*A and 0 = 0*

4: **Inverse Proposition**

A+/A = 1	*A or NOT A = 1*
A./A = 0	*A and NOT A = 0*

With these propositions a large number of Boolean algebra theorems may be developed, and proved. The most important which we will need are:

1: **De Morgan's Theorem**

/(A+B) = /A./B	*NOT(A or B) = (NOT A and NOT B)*
/(A.B) = /A+/B	*NOT(A and B) = (NOT A or NOT B)*

2: **Simplification Theorem**

A+A.B = A	*A or (A and B) = A*
A+/A.B = A+B	*A or (NOT A and B) = A or B*