Laws of Boolean Algebra Cheat Sheet

by johnshamoon via cheatography.com/33783/cs/10542/

Identities

0 + X = X
0 · X = 0
1 + X = 1
1 · X = X
X + X = X
X · X = X

Negation

X + ~X = 1
~0 = 1
~1 = 0
~~X = X
X · ~X = 0

Laws

Communative Law	A · B = B · A
	A + B = B + A
Associative Law	A · (B · C) = (A · B) · C
	A + (B + C) = (A + B) +C
Distributive Law	A · (B + C) = A·B + A·C
	A + B · C = (A+B)(A+C)

De Morgan's Laws

~(X · Y)	= ~X + ~Y
~(X + Y)	= ~X · ~Y
~(X · Y · Z)	= ~X + ~Y + ~Z
~(X + Y + Z)	= ~X · ~Y · ~Z

Theorems

Theorem 1

> X + X · Y = X

Theorem 2

> X + ~X · Y = X + Y

Theorem 3

> X · Y + ~X · Z + Y · Z = X · Y + ~X · Z

Theorem 4

> X(X + Y) = X

Theorem 5

> X(~X + Y) = X · Y

Theorem 6

> (X + Y)(X + ~Y) = X

Theorem 7

> (X + Y)(~X + Z) = X · Z + ~X · Y

Theorem 8

> (X + Y)(~X + Z)(Y + Z) = (X + Y)(~X + Z)