3.2.2 Boolean Identities

Identity Name	AND Form	OR Form
Identity Law	$1x = x$	$0 + x = x$
Null (or Dominance) Law	$0x = 0$	$1 + x = 1$
Idempotent Law	$xx = x$	$x + x = x$
Inverse Law	$xx' = 0$	$x + x' = 1$
Commutative Law	$xy = yx$	$x + y = y + x$
Associative Law	$(xy)z = x(yz)$	$(x + y) + z = x + (y + z)$
Distributive Law	$x + (yz) = (x + y)(x + z)$	$x(y + z) = xy + xz$
Absorption Law	$x(x + y) = x$	$x + xy = x$
DeMorgan's Law	$(xy)' = x' + y'$	$(x + y)' = x'y'$
Double Complement Law	$x'' = x$	

Table 3.5 Basic Identities of Boolean Algebra

Common Error

$$(xy)' \neq x'y'$$

Correction:

$$(xy)' = x' + y' \neq x'y'$$

x	y	(xy)	$(xy)'$	x'	y'	$x' + y'$	$x'y'$
0	0	0	1	1	1	1	1
0	1	0	1	1	0	1	0
1	0	0	1	0	1	1	0
1	1	1	0	0	0	0	0

Table 3.6
Truth Table for the AND Form of DeMorgan's Law